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No. 1238

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CONTENTS

MAJOR CROP PROGRESS AND WEATHER REPORTING

Sugar Beet Crop Plantings Noted
(Editorial Report).................................... 1

LIVESTOCK FEED PROCUREMENT

Economic Use of Green Fodder Discussed
(M. Imankulov, et al.; SEL'SKOYE KHOZYAYSTVO KIRGIZII, Apr 80).. 2

Barothermic Treatment of Straw Discussed
(A. Mamenko; PRAVDA UKRAINY, 16 Feb 80).............. 6

Briefs

Milk Veitch Used 10

LIVESTOCK

Development, Prospects for Livestock Complexes
(A. Tovstanovskiy; PRAVDA UKRAINY, 10 May 80)........ 11

Inter-Enterprise Association for Beef Production
(L. Yu. Skrinchuk; ZHIVOTNOVODSTVO, Mar 80).......... 16

Inter-Enterprise Swine Raising Complex in Udmurt ASSR
(T. Sukhikh, M. Gogolev; URAL'SKIYE NIVY, Nov, Dec 79).. 20

REGIONAL DEVELOPMENT

Application of Liquid Multicomponent Fertilizers in Belorussia
(I. N. Andreyanshchenko, et al.; SEL'SKOYE KHOZYAYSTVO BELORUSSII, Apr 80)........................ 31

TILLING AND CROPPING TECHNOLOGY

Bashkir Agricultural Scientists Review Progress, Plans
(N. R. Bakhtizin, et al.; STEPNYYE PROSTORY, Jan 80).. 34

Bashkir Party Head Reviews Harvest Achievements, Prospects
(M. Z. Shakirov; STEPNYYE PROSTORY, Feb 80).......... 45

Bashkir ASSR Deputy Minister Comments on Agricultural Goals
(B. I. Petrov; STEPNYYE PROSTORY, Mar 80)............ 47

Basis of Agricultural Achievements of Bashkir ASSR Reviewed
(N. Kozlov; SEL'SKOYE KHOZYAYSTVO ROSSII, Apr 80).... 51

New Chulpan Winter Rye Variety Holds Great Promise in Bashkiriya
(S. Kunakbayev, N. Bakhtizin; SEL'SKOYE KHOZYAYSTVO ROSSII, Apr 80).......................... 54

MAJOR CROP PROGRESS AND WEATHER REPORTING

SUGAR BEET CROP PLANTINGS NOTED

[Editorial Report] Moscow SEL'SKAYA ZHIZN' in Russian on 6 May 1980, page 1, reports planting of sugar beets has begun in Orlovskaya Oblast. Sugar beets will occupy 77,000 hectares--the largest sugar beet field in the Non-Chernozem Zone. Sugar beet growers in Orlovskaya Oblast will sell no less than 1,350,000 tons to the state. From the traditional rayons in the north and west the sugar beet crop has been shifted primarily to the south and southeast. Here the land is fertile and the climate is somewhat warmer, making for abundant, stable harvests.

About 200,000 hectares in Kurskaya Oblast are planted to sugar beets, the third largest sugar beet field in the RSFSR. This year they are hoping to gather 240 quintals of sugar beets per hectare. The sowing pace for the oblast as a whole is causing alarm. In Konyshevskiy and Khomutovskiy rayons the sugar beet growers brought their planters out onto the fields only in the second 5 days of May, but the necessary work pace has still not been attained. Planting is going slowly in Medvenskiy, Ponyrovskiy, Zolotukhinskiy and other rayons, where they have not maneuvered the equipment, the "window" between the rains has been used poorly, as reported in Moscow SEL'SKAYA ZHIZN' in Russian on 8 May 1980, page 1, and 11 May 1980, page 1.

Planting of sugar beets has been completed in Voronezhskaya Oblast. The sugar beet field here occupies 250,000 hectares. Spring was late here this year and rains hindered the field work. Planting of early and late crops had to be done simultaneously according to Moscow IZVESTIYA in Russian on 24 May 1980, page 1, and Moscow SOVETSKAYA ROSSIYA in Russian on 31 May 1980, page 1.

Planting of sugar beets has begun in Altayskiy Kray. Sugar beets will occupy more than 60,000 hectares, according to Moscow SOVETSKAYA ROSSIYA in Russian on 7 May 1980, page 1.

Planting of sugar beets on an area of more than 60,000 hectares has been completed in Altayskiy Kray according to Moscow TRUD in Russian on 21 May 1980, page 1.

CSO: 1824

LIVESTOCK FEED PROCUREMENT

ECONOMIC USE OF GREEN FODDER DISCUSSED

Frunze SEL'SKOYE KHOZYAYSTVO KIRGIZII in Russian No 4, Apr 80 pp 36-37

[Article by M. Imankulov, director of the KirgNITIPK [Expansion unknown]; V. Avdeyev, senior scientific worker, candidate of agricultural sciences; G. Orinenko, senior scientific worker: "An Economic Attitude Toward Green Fodder"]

[Text] In Kirgiziya the period of feeding cows with green fodder lasts 160-180 days. During this time they produce 50-55 percent of their milk as a rule. However, it turns out that the largest milk yield in all zones of the republic occurs in May and June.

Enterprises that do not have pastures in the mountains practice year-round stall upkeep of cows. During the summer period green fodder raised on the fields with crop rotations is fed to the animals. In such enterprises milk yield begins to drop in August-September and comprises 90 and 83 percent as compared to May and June. There is a general drop in milk yield of 19-17 percent. At this rate kolkhozes and sovkhozes underproduce milk by 120 kilograms per cow during the summer.

In places where animals are maintained on irrigated cultivated pastures during the summer or if the animals are taken out to pasture on perennial grasses the drop in milk yield occurs in September and October and comprises 6-12 percent. In such enterprises underproduction comprises 60 and more kilograms of milk per cow (Table 1).

By comparing this data and the upkeep methods during the summertime we can draw the conclusion that further increases in milk production in Kirgiziya can be achieved if we replace summer upkeep in the mountains and summer stall upkeep by pasture upkeep (on cultivated irrigated pastures).

The kolkhozes and sovkhozes of Sokulukskiy Rayon which in recent years have pastured their dairy cattle on specially-created cultivated pastures or perennial grass pastures have achieved a noticeable increase in the productivity of cows (Table 2).

Table 1

Average Monthly Milk Yield per Cow During Summer Period in the Enterprises of Chuyskaya Valley With Various Methods of Upkeep (1976-1978)

Upkeep of cows	Milk yield, kilograms/%					
	April	May, June	July	August	September	October
In mountain pastures	258/87	295/100	286/98	255/75	173/59	151/51
Stall upkeep, utilizing green fodder	304/97	351/100	349/99	345/98	319/91	292/83
On cultivated pastures	356/98	363/100	370/102	370/102	341/94	318/88

Table 2

Annual Milk Yield and Milk Increase per Forage Cow Under Various Methods of Feeding

Cow upkeep	Enterprises of Sokulukskiy Rayon	1973	1974	1975	1976	1977	Average annual milk increase, kg
On cultivated pastures	Sokulukskoye Experimental Farm of KirgNPOZh*	4428	4518	4698	4826	4951	---
	Increase	377	90	180	128	125	130
"	Dzhangi-Dzher Sovkhoz	2971	3096	3253	3444	3498	---
	Increase	472	125	157	191	53	132
"	Rassvet Kolkhoz	3074	3223	3075	3254	3365	---
	Increase	---	149	148	179	111	73
"	Sovkhoz im. 50-Letiya SSSR	3870	3990	4043	4130	4115	---
	Increase	---	120	44	96	15	68
Stall, using green fodder from agronomy	Kolkhoz imeni Lenin	3039	3098	3153	3283	3219	---
	Increase	---	59	55	130	64	45
"	Kolkhoz im. 21 Parts"yezd	3230	3299	3199	3198	3391	---
	Increase	---	69	100	1	193	40

*Scientific Production Organization of Animal Husbandry

The average annual increase in milk yield in most enterprises of the rayon comprise from 68 to 132 kilograms, or 2-3 times more than in enterprises which maintain cows in stalls during the summertime, never mind the yield of cows maintained in the mountains during this time. A small increase in milk yield was achieved in 1973-1977 by the Kolkhoz imeni Lenin and the Kolkhoz imeni 21 Parts"yezd in particular, where the production and utilization of green fodder are still not yielding the desired results because it is still less advantageous to cultivate green fodder for additional green feed than to utilize pasture feed.

The pasturing of cows begins 10-12 days earlier on sown pastures and continues for 10-15 days longer in the fall. Pasture upkeep encourages the strengthening of the condition of the animals and an increase in their productivity. In stall feeding cut grasses comprise 60-65 percent of the total ration of cows; in pasture upkeep--75-80 percent. This means that cows with an annual milk yield of 3,000-4,000 kilograms of milk eat 15-20 kilograms of grass more each day while pasturing than while in stall upkeep. During the pasture period (150-180 days) this is 3-3.5 tons of fresh grass. Consequently, a portion of the concentrated feeds can be replaced by pasture feeds and the total expenditure of concentrates will drop by 10-15 percent.

In feeding animals from troughs the losses of green fodder comprise 28-30 percent of the cut mass. These losses begin in the field, from the moment of mowing, and end at the trough.

When pasturing animals on sown pastures the largest losses are no more than 20-24 percent. If after grazing the remainder is mowed and collected losses are brought down to a minimum. Pasture grass is 2-2.5 times cheaper than mowed and delivered grass.

The cost of a quintal of milk is usually 25-27 rubles. During the summer, when the cows are moved out to pasture (on sown cultivated pastures or perennial grass pastures) it is no more than 16-18 rubles. The machines and people that are needed to mow and prepare grasses in stall feeding of livestock could be utilized in other feed-production jobs. The regiment for feeding animals is precise and the schedule must be strictly maintained. Milkmaids have 15-20 percent of their time free and they can use it at their discretion.

The extensive introduction of and replacement of summer stall upkeep of cows by pasturing are hindered by the false belief that large expenditures are required for the organization and creation of cultivated pastures.

According to the annual reports of recent years in the rayons of the republic 2,379,000 quintals of green fodder were used to feed cows alone. To raise the green fodder, 9,721 hectares of land were used. The average yield of green mass was 244 quintals per hectare. In addition, 2,916 hectares of perennial grass lands were allocated for grazing purposes.

The total area comprises 12,637 hectares. If we increase the productivity of green mass to 450-500 quintals per hectare the aforementioned area will fully supply the needs of cows for the green fodder in the rayons of the republic. This will be true if their productivity is 3,000 and more kilograms of milk per year. There will be no alienation of lands from general feed production in the kolkhozes of the republic's rayons.

In the sovkhozes of the rayons in this republic and in Oshskaya Oblast, for example, in 1977 1,642,900 quintals of green perennial grasses were consumed (by a herd of cows numbering 70,000). The area needed to produce this feed was 8,014 hectares and the yield of green mass was 205 quintals per hectare. In addition, 4,742 hectares were utilized for grazing (without considering the harvest).

It is possible not to fence in cultivated pastures, if we borrow from the experience of pasturing cows with the aid of electric fences in the Rassvet Kolkhoz or the Seed Farm imeni 50-Letiya SSSR of Sokulukskiy Rayon. In the last 10 years 2,000 cows have grazed on alfalfa and each herd received its own field.

The creation of cultivated pastures on areas close to farms as well as the replacement of utilizing green fodder in stall upkeep by pasturing animals on perennial grasses will enable farmers to mobilize all their reserves in a short period of time for the more complete and efficient utilization of resources such as land, water, fertilizers, grasses, structures, etc. In the final analysis all of this will result in a large volume of additional production.

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8228
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LIVESTOCK FEED PROCUREMENT

BAROTHERMIC TREATMENT OF STRAW DISCUSSED

Kiev PRAVDA UKRAINY in Russian 16 Feb 80 p 2

[Article by A. Mamenko, senior scientific worker of the Scientific Research Institute of Animal Husbandry of the Forest-Steppe and Poles'ye of the UkSSR and candidate of agricultural sciences: "How to Provide Better Straw Feed"]

[Text] Straw still plays a leading role in the feed balance in many kolkhozes and sovkhozes. However, the feed value of straw is very low. It is poor in protein and the protein that is available in straw is of a low biological value. The digestibility coefficient of straw protein does not exceed 40 percent. The non-nitrogen extract substances contained in it are poorly digested by animals for all practical purposes. Straw plays a role mainly as a balancing feed that is necessary for normal digestion and for adding volume to the ration. At the same time, despite the low feed qualities, it contains a large quantity of some complex carbohydrates which are nutritionally valuable for ruminants.

By utilizing various methods of preparing straw for feeding (thermal, chemical, physical, biological and combined) it is possible to significantly raise its nutritive value and to produce additional animal products. If we raise the nutritive value of 1 kilogram of straw to 0.4 feed units, which is completely realistic today, it is possible to increase feed units supplied for Ukrainian animal husbandry by 7-8 million tons.

Of all the methods for improving the feed value of straw not all are equally highly effective. Thus, the crushing of straw to a flour-like state does not increase, and even worsens its eatability and digestibility by animals. Thorough cooking, steaming, crushing, mixing with other feeds as well as granulating and briquetting (without the addition of chemical reagents) only improve the eatability of straw but do not raise the digestibility coefficient of nutritive substances.

In recent years industrial methods of chemically treating coarse fodder have been more and more widely introduced. Nevertheless, industry has not yet satisfied the needs of agriculture in the necessary chemicals for these purposes. It is essential to seek out other methods whose use will not depend on the availability of alkaline reagents.

Scientific experiments and practical experience have shown that the most effective method is the treatment of straw by cooking in an autoclave at a pressure of 6-7 atmospheric units. This method includes pressing, preliminary moistening of straw to 70 percent, loading in special autoclaves and holding there at a temperature of 155-158° at a pressure of 6 atmospheric units for 2-2.5 hours. This type of barothermic treatment of straw encourages a growth in the content of easily-digestible carbohydrates and as a result, in the nutritive value from 0.20-0.25 to 0.50-0.55 feed units (calculated on the basis of dry substance). Under optimal conditions of treatment the quantity of sugar in absolutely dry substance increases from 0.7-0.9 percent to 10-12 percent. By treating straw using the barothermic method it is possible to increase the digestibility of cellulose to 70 percent and that of non-nitrogen extracted substances--to 75 percent and more.

The aforementioned technology of straw treatment has passed production testing in the enterprises of Leningrad Oblast and Mariyskaya ASSR. The results are promising. The productivity of animals in milk yield and in weight gain while being fattened was higher than in control groups. There are examples of this in the enterprises of the Ukrainian SSR.

For example, in the Kiev area leading enterprises are successfully utilizing scientifically-based rations to feed animals and birds. The rations are balanced in all nutrients and energy. Nevertheless, a detailed analysis of the entire balance of feed production in Kiev Oblast shows that rations, in addition to containing a shortage of protein, has a significant deficit of easily digestible carbohydrates and the level of the sugar-protein ratio is 1.5-2 times lower than normal. This results in a drop in the digestibility of nutrients, a worsening in the utilization of protein and especially of its synthetic fillers and in a significant overconsumption of feed and a decrease in the productivity of animals.

Kiev Oblast is a large supplier of commodity grain and this of course has an effect on feed production. In the oblast each year 1.5-2 million tons of straw are procured. Raising its nutritive value would serve as a resource for producing 400,000 additional tons of feed units, and securing the conversion of complex polysaccharides into simple sugars could be the source of 160,000 tons of easily-digestible carbohydrates.

This year some rayons in the oblast (especially in the poles'ye) procured less feed than in preceding years because of the unfavorable weather conditions. In order to preserve the herd and to secure the fulfillment of plans on the production and sale to the state of animal products, a number of measures have been planned and are being realized in Kiev Oblast. Among them, an important role is being played by barothermic treatment of straw. Thirteen autoclaves have been bought for this purpose and special shops are being built in Polesskiy, Makarovskiy, Borodyanskiy, Ivankovskiy, Chernobyl'skiy, Borispol'skiy, Tarashchenskiy, Mironovskiy and Vyshgorodskiy rayons. In order to decrease expenditures for construction the shops were located near existing powerful sources of steam.

Rayon interfarm enterprises on the production and processing of feeds, interkolkhoz mixed-fodder plants, large livestock raising complexes and the sovkhoz trust are the customers in introducing this new technology for preparing feed for feeding.

Workers of the Scientific Research Institute of Animal Husbandry of the Forest-Steppe and Poles'ye of the UkSSR participated in the elaboration of technology. The experience of Leningrad and Gomel'skaya oblasts as well as that of the Mariyskaya ASSR was considered. Planning work was performed by the Kiev affiliate of Ukrkolkhozproyekt [Ukrainian kolkhoz planning institute]. Participating in the building of shops and in the installation of equipment were oblast and rayon associations Mezhkolkhozstroy [Interkolkhoz construction association], Goskomsel'khoztekhnika [State Committee of the Agricultural Equipment Association], and specialized trusts Kiyevspetssel'khozmontazh [Kiev special agricultural installation trust], Yuzhteploenergomontazh [Southern heat and energy installation trust], Yuzhatomenergostroy [Southern atomic energy construction trust] as well as other organizations. Individual jobs were performed using their own resources.

The shop for the barothermic processing of straw in Makarovskiy Rayon is the first such structure in the Ukraine. Multiple construction elements and equipment were utilized to build the shop. The foundation for the shop was two autoclaves manufactured in Poland. The shop is located very close to the boiler room, where three converters of the DKVR-2.5/13 type belonging to the flax plant were installed. The shop's products are delivered to the complex for fattening cattle in the Kommunist Kolkhoz, where production testing takes place on the effectiveness of the barothermic treatment of straw. Average expenditures for building the shop for the barothermic processing of straw based on one autoclave comprise 130,000 rubles.

Each day one autoclave working a triple shift can "sugar" no fewer than 15 tons of straw. It is possible to produce a supplementary 3,000 feed units with an average cost of 7 kopecks per unit. The cost of 1 kilogram of carbohydrate obtained additionally as a result of the barothermic processing of straw is 20 kopecks. In shops with two or more autoclaves these indicators are significantly lower.

Although at the present time the cost of each ton of straw received for processing increases by over 10 rubles, the expediency of the expenditures is justified through obtaining high quality feeds from practically inert raw materials.

Barothermic processing of straw is one of the most highly productive and effective methods for raising the nutritive value of straw. Nevertheless, it cannot be utilized everywhere without a consideration of specific conditions and primarily of the ratio of nutrients in rations. Apparently, in the forest-steppe zone where there are inexpensive sources of carbohydrates (molasses, corn, feed and sugar beets) the nutritive value of straw can be increased by other, less energy-consuming, less metal-consuming methods that require smaller capital investments.

But even with all of these expenditures the barothermic processing of straw is a good resource for feeding animals. Of course, its use does not free specialists and directors of enterprises from the necessity to strengthen the feed base of animal husbandry in general.

8228
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BRIEFS

MILK VEITCH USED--Tashkent SEL'SKOYE KHOZYAYSTVO UZBEKISTANA in Russian No 4, Apr 80 p 36 carries a short article on the advantages of utilizing Khiva milk veitch [Astragal Khivinskiy] in agriculture. However toward the end of the article the author mentions other possible uses for Khiva milk veitch including that of livestock feed: "Khiva milk veitch is not a bad feed plant. It is eaten throughout the entire summer by sheep, goats and other livestock. It keeps well in the winter. The feed supply of its green mass comprises an essential part of the feed balance on natural pastures in the Kyzylkum and Karakum.... Khiva milk veitch can be recommended for introduction into the sandy deserts of Central Asia." [Editorial Report]

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LIVESTOCK

DEVELOPMENT, PROSPECTS FOR LIVESTOCK COMPLEXES

Kiev PRAVDA UKRAINY in Russian 10 May 80 p 3

[Article by A. Tovstanovskiy, deputy minister of agriculture for the UkSSR: "The Complex--Yesterday and Today"]

> [Text] The 25th party congress determined that the conversion of livestock production to an industrial basis is among the most important areas where agriculture can be intensified. This policy was confirmed in decisions made by the July (1978) Plenum of the CPSU Central Committee.

In fulfilling their assigned tasks the UkSSR Ministry of Agriculture, other agricultural ministries and departments, and the Southern Division of Vaskhnil worked out and implemented an integrated program for achieving scientific and technical progress in the agro-industrial complex during the period 1976-2000. Industrial livestock complexes and farms are being built at special facilities, interfarm enterprises and associations in accordance with the general siting plans for the periods of the 10th and 11th Five-Year Plans.

During the current five-year plan more than R4.2 billion have been spent on the construction of livestock complexes and farms, which is significantly more than in the 9th Five-Year Plan. Currently, 1137 such complexes are in operation in our republic. Their share of the total livestock production is not very large yet, but the future is theirs, and every year their contribution to the production of important foodstuffs will steadily grow.

The work experience of the collectives at many livestock complexes indicates the high production efficiency achieved by using industrial methods. Thus, at the dairy complex on the "Oktyabr'" kolkhoz in Mar'inskiy Rayon, Donetskaya Oblast one operator handles 100 animals. The 1979 annual yield of milk per head was 3556 kg, which is 200 kg more than called for by the design. The unit cost of a quintal of milk dropped to R15.81, and profitability reached nearly 60 percent. O. Ye. Kapatsin and A. Ye.

Voytenko, members of the operators' section at the "Rossiya" kolkhoz in Mogilev-Podol'skiy Rayon, Vinnitskaya Oblast, milked 4375 kg from each of their 250 cows.

The livestock breeders at the Verkhnedneprovsk Interfarm Beef Enterprise in Dnepropetrovskaya Oblast have also achieved high production figures. Last year 5,600 calves were fattened and sold to the state here; they had an average weight of 407 kg. This complex has achieved a daily incremental weight gain of 764 grams, with 5.6 quintals of feed being expended per quintal of weight gain and the cost of a quintal of weight gain dropping to R79.4. The operators A. A. Shein of the Chervonoznamensk Interfarm Enterprise in Odesskaya Oblast and I. F. Shepel' of the Pal'mir Livestock Complex in Cherkasskaya Oblast achieve daily incremental weight gains of 1064-1300 grams of beef production, while N. A. Prorok, a specialist in fattening pigs at the "Lenin" kolkhoz in Znamenskiy Rayon, Kirovogradskaya Oblast, while handling about 2000 animals achieves weight gains of 462 grams per head.

Industrial technology permits us to improve the quality of production achieved with low feed expenditures and at the same time have significant growth in production volume. Labor productivity at such complexes is 1.5-2.6 times higher than the kolkhoz average for our republic, and the cost of this production is significantly lower.

However, production efficiency still remains low at a number of livestock complexes, because their technological potential is being poorly realized.

Modern livestock complexes are as well off as industrial concerns in the level of their production concentration, technical equipment, and regularity of production. Therefore, here--just as in industry--integrated plans must be developed and implemented to bring them up to production capacity. These plans should begin with the conduct of preparatory work, the design, and construction and end with the total commissioning of the new enterprise. However, a number of farms which have built livestock complexes have no such plans.

Modern, major, mechanized farms and complexes require primapara heifers bred and maintained using modern technology and checked not only for their productivity, but for their suitability for machine milking, too. This is being done at many farms in Ivano-Frankovskaya, L'vovskaya and certain other oblasts. But a number of farms are building their herds with livestock having low productivity and which are not adaptable to industrial technology. As a result, animal productivity drops, and milk production becomes unprofitable.

A program for the directed breeding of a reparatory herd is being introduced at special farms in the republic; these farms already supply more than a quarter of our non-calving young cows.

However, the conversion of cattle breeding to an industrial basis is a problem which is still being solved quite slowly.

A very important factor for success in bringing livestock complexes and farms up to capacity is the establishment of a stable feed base. In 1978 the Verkhnedneprovsk Interfarm Enterprise, for example, experienced a per hectare yield of 40 quintals of feed from each of its 1091 hectares, but that figure jumped to 59 in 1979. The enterprise is now fully supplied with succulent and green fodder. A stable feed base has permitted the "Kommunar" kolkhoz in Starokonstantinovskiy Rayon, Khmel'nitskaya Oblast, which performs the functions of an interfarm enterprise, to increase its production of beef 2.1-fold over the 4 years of this five year plan.

The livestock complexes cannot get by without establishing irrigated plots to assure the production of feed. However, an analysis shows that at many farms the introduction of such plots into operation is being delayed. The ministry and oblast/rayon agricultural directorates are taking the necessary steps, but the matter does not depend entirely upon them. So it is that the organizations in the UkSSR Ministry of Land Reclamation and Water Resources fail to ensure that irrigation systems with an area of more than 9000 hectares are built, and this leads to a significant shortfall in feed.

The increase in the cost of livestock complexes and the unjustified growth in the ratio of capital investment to cattle-place cause us serious concern. According to experts' data, during the period 1978-79 alone the institutes Ukrainkolkhozproject, Ukrainagritechproject, Ukrainrurproject, and several others permitted unjustified increases in the estimated cost of building agricultural facilities amounting to more than R20 million.

In our view it is excessive decentralization in designing rural facilities that explains this phenomenon. More than 100 design institutes, their branches, and the organizations of various union and republic ministries and departments carry out such projects. This creates unnecessary parallelism, which leads to an increase in management overhead. In addition, at a number of institutes--including Ukrainkolkhozproject and Ukrainagritechproject--the amount of design work to be done is determined on the basis of direct agreement with the client, which often leads to an increase in design backlog, because construction of these facilities is not included in the material/technical provisioning plan.

It is apparent that Gosplan and Gosstroy of the UkSSR and other interested ministries ought to do an in-depth study of this issue in order to assign all design work to a republic state-kolkhoz production association or scientific-production association. All the design organizations in the ministries of agriculture and sovkhozes for the republic, Ukraininterkolkhozconstruct, Statcomagritech, and the UkSSR Ministry for Agricultural Construction should participate in it. The association should resolve issues concerning improvements in the organization of agricultural facility design work, enhancement of its quality, reduction of the time needed for completion of the design documents, elimination of duplication, and the implementation of a unified policy for equipment and technology based on the latest achievements of science and technology.

It is also essential that a rule be introduced to provide that new, prototype designs be done with the participation of scientific-research institutions of the technological type.

Experience shows the need for providing better pre-design technical/economic justification for construction of the complexes and for setting a single cost level above which sovkhoz-like facilities being built at kolkhozes and interfarm enterprises must be shown to be technically/economically justified.

A procedure ought to be established whereby the design--much less the construction--of livestock complexes costing R1 million or more would not be begun without detailed technical/economic justification for them. This document should reflect the primary factors necessary for these complexes to function: the provision of feed and the head of livestock needed.

In developing the capacity of the complexes much also depends upon the quality with which the plans are executed. For example, new complexes for fattening large-horned cattle (at the Petrovskiy Kolkhoz in Volnovakhskiy Rayon, Donetskaya Oblast) and for breeding non-calving young cows (at the Radyans'ka Ukraina Kolkhoz in Krasnilovskiy Rayon, Khmel'nitskaya Oblast) were built in short periods and with high work quality. And a good pig breeding complex was built at the Avrora Kolkhoz in Nikopol'skiy Rayon, Dnepropetrovskaya Oblast by reconstructing and expanding older facilities.

At the same time instances occur wherein construction of the complexes stretches out inexcusably. Facilities under construction grow obsolescent and vast resources are frozen.

There are cases where the contracting construction organizations permit deviation from design decisions and violate technical specifications, norms, and rules. In 1979 such occurrences took place at a number of kolkhozes in Kirovogradskaya, Zhitomirskaya, and Cherkasskaya Oblasts.

The contracting construction organizations must be made more responsible for fully and promptly completing their construction plans and for putting their facilities into operation.

The responsibility of the procurement and assembly organizations within Statcomagritech of the UkSSR should also be increased. Both they and the general contracting organizations should have to enter into their yearly plans the deadlines for putting their facilities into operation and the indicators of their capacities.

The conversion of livestock production to an industrial basis requires correct technical exploitation, reliable and continuous operation of all equipment lines, machinery, and gear, and consequently, well organized material provisioning and a precise system of planned preventive maintenance for the industrial complexes and farms.

However, a number of deficiencies arise here. Many complexes are not covered by the maintenance services of Ukrainstatcomagritech. There is still work to be done in performing periodic maintenance on the farm equipment and implementing quality control, and unauthorized increases in the cost and conduct of such work are permitted. Not all the technical service stations are adequately supplied with a rotable pool of assemblies, subassemblies, spare parts or maintenance materials.

Personnel play an important role in bringing these complexes up to capacity too. The achievements of the advanced farms can be largely explained by the fact that well-trained operators, trouble-shooters, electrical workers, and others work at them. These personnel have mastered the basics of animal husbandry and animal biology; they know their jobs and how to operate their complex equipment.

At the same time a number of farms are not devoting proper attention to the training of skilled personnel in the most populous professions, particularly in regard to work at livestock complexes. Engineers, livestock specialists, and veterinary workers are not held adequately responsible for this important matter.

Industrial livestock complexes will be built during the 11th Five-Year Plan as well. Therefore, their work efficiency must be further improved if we are to successfully solve the problem of increasing and improving the quality of livestock production, both in the near and the far term.

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LIVESTOCK

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INTER-ENTERPRISE ASSOCIATION FOR BEEF PRODUCTION

Moscow ZHIVOTNOVODSTVO in Russian No 3, Mar 80 pp 19-20

[Article by L. Yu. Skrinchuk, chairman of the Ukraina Kolkhoz in Chemerovetskiy Rayon, Khmel'nitskaya Oblast: "Interenterprise Association for Beef Production"]

[Text] In a report delivered before the July (1978) Plenum of the CPSU Central Committee, the General Secretary of the CPSU Central Committee and Chairman of the Presidium of the USSR Supreme Soviet, Comrade L.I. Brezhnev, emphasized: "Interenterprise cooperation is a great and complicated objective process. It should not be restrained, nor should it be hastened. The work must be carried out in a planned and well thought out manner and in combination with other measures concerned with the intensification of agricultural production. In carrying out our work, we are guided by this statute. This is now the second year of operation for the Ukraina Interenterprise Association for Beef Production -- based upon the livestock farms of a kolkhoz and farms for the maturing of long-horn cattle in the villages of Chemerovets, Yampol'chik and Teremkovets and also in the village of Yurkovets, where cattle undergo final fattening. The best conditions have been created for implementing the achievements of science and leading experience."

This association for the production of beef was organized as a result of voluntary cooperation on the part of kolkhozes, directed towards raising the level of intensification of beef production. Cooperation calls for the carrying out of plans associated with the maturing, fattening and sale of long-horn cattle to the state, the creation of a stable feed base, the intensive use of production capabilities, installations and equipment, the observance of a regime of thrift, a reduction in output production costs, improvements in production profitability and the introduction into operations of scientific achievements and leading experience.

The association includes all kolkhozes in the rayon which participate in the work of supplying it with young stock and feed. The participation of our kolkhoz in the interkolkhoz association was defined in a decision handed down during a general meeting for the members of the kolkhoz. The relationships of the association with its members are based upon contractual arrangements. Various types of information are furnished in a contract: the number and schedules for deliveries of young horn-cattle stock for maturing and fattening, provision of the required amounts of feed (treacle, pulp residues), procedures for the maintenance of mutual accounts and the responsibility of the parties involved for non-fulfillment of the contract. The association accepts young stock from the kolkhozes for maturing and subsequent fattening. These animals are maintained on the balance of the kolkhoz -- member of the association. The increase in cattle obtained (and sold), minus the delivery weight, is distributed among the suppliers proportional to the amount of feed, in feed units, expended for the fattening of the cattle.

As the cattle are sold to the state and in accordance with the state receipts, the association credits the beef delivered to a particular kolkhoz. Upon the completion of the fiscal year, the total amount of net profit is determined and then distributed in accordance with a decision handed down by the rayon kolkhoz council. A portion of this profit (in accordance with the estimate) is withdrawn for the creation of the association's fund and the remaining profit (no less than 80 percent) is distributed among the members of the association depending upon the investments (for each ruble).

The association is an independent cost accounting organization which enjoys legal rights, has its own balance, estimates and other accounts in Gosbank and carries out its own operations in conformity with the status approved by the rayon kolkhoz council and registered in the executive committee of the rayon council of worker's deputies.

The operation of the farm changed considerably following the conversion over to specializing in the production of beef. The cropping power of the agricultural crops increased sharply on the farm, a greater increase took place in the number of animals, the economy became stronger, the real income of kolkhoz members increased and improvements took place in the overall culture of production. It bears mentioning that during the first 2 years of the Tenth Five-Year Plan alone, the cropping power of sugar beets, potatoes and vegetables, compared to the same period during the Ninth Five-Year Plan, increased by 20-35 percent; 50-52 quintals of grain were obtained per hectare and sugar beets -- 400-500 quintals per hectare. A complex plan was developed at the kolkhoz for the intensification of feed production. Animal husbandry is supplying its own feed, with the exception of a small quantity of treacle and pulp residues, which are being provided by the supplier-kolkhozes. Fifty two percent of the farm's area has been set aside for forage crop use. Last year, 35-40 quintals of feed units per hectare (3.5-4 quintals of protein) were obtained. The preparation of mixed feed and the enrichment of it with BVD [protein-vitamin additives] are promoting a reduction of 10-15 percent in expenditures for concentrated feeds. The mixed feed is being supplied by an interenterprise mixed feed plant.

All of the straw is placed in ricks and turned over to the foragers. We prepare our silage from corn. The stalks are crushed and spring straw is added. The bulk is enriched with urea at the rate of 4-5 kilograms per ton and, in addition, we add Glauber's salt -- 2 kilograms per ton -- to the silage. This increases the number of sulphur-containing amino acids, it lowers nutrient losses and it raises the biological value of the feed.

The farm is confronted by a very important task at the present time -- to supply animal husbandry with the required quantities of granules and feed briquettes. The interenterprise mixed feed plant is unable to satisfy these requirements. Thus the association has commenced the construction of a feed combine. In this regard, the structure of the areas under crops must be improved so as to be able to obtain 50-55 quintals of feed units and 5-5.5 quintals of protein per hectare.

Improvements in the cropping power of the grain and forage crops has made it possible to introduce a progressive technology for the fattening of the animals, to obtain high weight increases, to improve the quality of the output and to reduce expenditures for beef production.

The new fattening technology calls for the use of three raising periods for the young stock: from 50 to 250 kilograms of weight, from 250 to 350 kilograms (duration of fattening 120 days) and from 350 to 500 kilograms of weight.

During the first period, the fattening of the young stock is based upon supplying the animals with protein, mineral substances and vitamins in conformity with their physiological condition. During the second period, we increase the proportion of succulent and concentrated feeds. The third period consists of intensive fattening. The task is one of ensuring that maximum weight increases are realized during all periods.

The type of fattening is mainly silage-pulp residue, with use also being made of granules and microelement additives. During the winter-indoor maintenance period, we add the following to the ration for young stock: cobalt chloride and cobalt sulphate with manganese sulphate or zinc sulphate, cobalt with copper sulphate. This makes it possible to obtain an average daily weight increase of 900-1000 grams.

The industrial technology for beef production has raised the need for employing new types of feed, preparing them for feeding to the animals and developing a proper fattening technique such that the complex mechanization of the feed preparation and distribution processes will be ensured.

In 1975, a complex for 2,000 head was placed in operation within the association. At the present time, an additional complex for 3,000 head is under construction at the Vishnivchik Sugar Plant. This complex will enter operations this year.

In 1977 the association obtained 1.31 million rubles worth of net profit from its cattle fattening operations and its profitability level was 50.3 percent; in 1978 the figures were 1.5 million rubles and 61.5 percent respectively. Such profit became possible mainly owing to the fact that the animals were sold in a higher than average state of nourishment and under good weight conditions (450-500 kilograms).

In order to achieve higher indicators during the Eleventh Five-Year Plan, it will be necessary to increase sharply the number of fattened animals and accelerate the construction of facilities for their maintenance.

The animal husbandry workers are successfully fulfilling their plans and socialist obligations. The results of the socialist competition are being summarized monthly and quarterly, the winners are being awarded challenge red pennants, monetary prizes and valuable gifts and red flags are being raised in their honor. The experience of leading workers is being publicized systematically in the calendars of labor glory.

All ideological-educational work is being directed towards the carrying out of all socialist obligations undertaken, employing a creative approach in completing assigned tasks and displaying a high degree of responsibility for solving national tasks. The socialist competition aimed at raising production efficiency and improving the quality of work is serving as a great driving force in this regard.

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INTER-ENTERPRISE SWINE RAISING COMPLEX IN UDMURT ASSR

Sverdlovsk URAL'SKIYE NIVY in Russian No 11 and No 12, Nov and Dec 79

[Article by T. Sukhikh, economist for the Ministry of Agriculture for the Udmurt ASSR and M. Gogolev, senior teacher at Udmurt State University: "Inter-Enterprise Swine Raising Complex"]

[Nov 79, pp 21-24]

[Text] Organization and Technology

An inter-enterprise swine raising complex is in operation in Uvinskiy Rayon in the Udmurt ASSR. Its plan was borrowed for the most part from the main technological solutions used for the Rasskazovo Swine Raising Complex in Tambovskaya Oblast, which embodied recommendations made by the USSR Ministry of Agriculture.

The construction of the complex began in 1973 and the first phase -- the fattening department -- was placed in operation in 1976. It was built using the combined resources of 11 kolkhozes and one sovkhos in Uvinskiy Rayon. It is a highly specialized enterprise of the industrial type for the production of pork. Although its design capability has not been achieved, nevertheless its production activity already confirms the economic advantages of the cooperative arrangements.

The production activity of the complex is based upon a system of technological and organizational-technical means and methods for ensuring the development of high production indicators, which in turn promote improved labor productivity combined with more improved use of available area. The chief features of the technology include: separate-departmental organization of production; specialized raising of young stock; special servicing of the animals by definite production-age groups; mechanization and automation of production processes.

The design capability of the complex -- 24,000 swine or 2,000 tons of pork annually. Simultaneously, 9,000 head of young stock can be supplied for fattening purposes. The young pigs delivered for fattening are 4 months of age and have a live weight of no less than 35 kilograms. The fattening work is completed when a live weight of 100-110 kilograms is achieved. The average duration of the fattening regime is 135-137 days. The average daily increase in live weight during the maturing period is 450 grams and during fattening -- 500 grams.

Although the enterprise has been in operation for only 2 years, nevertheless its advantages were revealed even during the period devoted to developing its design capability, as borne out by the data in the Table.

Principal Economic Operational Indicators of the Uvinskiy Complex in 1977-1978

Indicators	Plan	Actual	
		1977	1978
Swine for fattening, number of head	24,000	5,490	11,100
Annual output, in tons	2,000	324	888
Average daily increase in live weight, in grams	500	450	456
Feed consumption per quintal of output, in quintals of feed units	6.0	5.4	5.0
Production cost per quintal of output, in rubles	80.00	101.40	96.62
Profitability, in %	-	36.0	41.1

Compared to 1977 when the complex provided 73 percent of the overall amount of pork sold in the rayon, last year the figure increased to 78.8 percent.

The production activity of the enterprise is directed by a meeting of authorized agents (representatives of the farms) and by the council of the inter-enterprise complex. Operational management is provided by the enterprise's administrative apparatus, headed by the director (he is also the chairman of the council).

Meetings of the authorized representatives of the participating farms are held no less often than once each year. A special meeting may be convened upon the request of no less than one third of the authorized representatives or the inspection committee.

The plan calls for a complete technological cycle for production -- from obtaining the young pigs to fattening and sale. The complex is supplied with young stock by farms in Uvinskiy and neighboring rayons: Syumsinskiy, Seltinskiy and Vavozhskiy rayons.

The relationships between the farms are defined in the agreements. They stipulate the quantities and live weights for the animals to be delivered for fattening, the accounting prices, schedules, procedures and conditions of delivery and the mutual responsibility of the parties involved in the event of non-fulfillment of the contractual obligations.

In 1978, 14,000 swine were accepted for fattening. The average live weight per head was 40 kilograms. In behalf of the kolkhoz plans, 11,100 head of swine representing an overall live weight of 1,227 tons were fattened and sold to the state. The average live weight of one swine was 109 kilograms. Seventy one percent of the animals sold were accepted as being in the first or second categories.

In the case of cooperative arrangements, special importance is attached to ensuring that the economic relationships between the farms are controlled in a proper and fair manner. At times, use is made of state procurement prices. But this is not entirely correct. The fact of the matter is that they were established taking into account the expenses for an entire production cycle. But they differ during the various stages of production. More resources and labor are required for raising young stock than for fattening them. This fact should be taken into account. The state procurement prices should obviously be considered as final. But we are of the opinion that there should be accounting prices during the intermediate stages of production which compensate for the production expenses and which ensure appropriate profitability for the reproducing farms.

These prices must be controlled so as to ensure that it is more profitable for the reproducer to sell the young stock than to fatten them himself. A procurement price does not create such material interest.

An accounting price of 247 rubles and 57 kopecks per quintal of live weight is established for farms participating in such cooperation. This price includes the normative production cost and profit. The normative production cost is determined based upon rational expenditures under specific production conditions. The price is computed for the purpose of orienting the cooperating farms towards introducing a standard progressive technology and production organization. In the normative output production cost, distinct from the actual cost, the unproductive expenses and losses are not included. However, the actual level of production development achieved is taken into account.

The estimated profit is determined based upon the normative total amount of earnings realized from the sale of products and the normative expenses for their production during all of the technological stages.

Experience has shown that the maintenance of swine in one section, in both small (10-15 head) and large groups (up to 400 head), is unprofitable, since under such conditions it is difficult to achieve high weight increases, the schedules are prolonged and the production costs increase.

Therefore, at this complex the animals will be maintained in sections containing 18-23 head.

Upon arriving at the complex, the swine are weighed in groups. Subsequently they pass through a disinfecting bath, are dried out under heating elements and once again they are weighed. Thereafter, they are again formed into groups.

Sections are used for accommodating swine of the same sex and roughly of the same age. This facilitates the task of tending them, it simplifies the organization of feeding and it reduces the danger of the young stock becoming infected by diseases transmitted by older animals. Moreover, in such instances it is easier to observe the operational cycle in the production processes and to free the facilities of swine in a timely manner, which in turn makes it possible to carry out veterinary-prophylactic measures and current upkeep.

In order to expose diseases of a concealed nature, all of the swine undergo a monthly quarantine in a special facility. It can handle 4,000 head and it is used for sanitary processing and for accustoming young stock received from farms to dry feed. Young pigs for maturing are delivered at 4 months of age weighing an average of 35-40 kilograms. One month later they are transferred to the fattening shop, at which time their live weight is 50-55 kilograms.

This department can accommodate 9,000 head. Its technological line appears as two rows of connected cages. The shop has six such lines.

At the Uvinskiy inter-enterprise complex, which does not have its own feed base, year-round feeding is carried out on the basis of imported concentrated dry feed being supplied to the animals five times daily. The feed is supplied five times daily owing to the fact that not all of the feed is consumed when larger portions are provided; a portion of it is trampled underfoot by the animals.

The industrial fattening technology calls for a reduction in the expenses required for producing pork. In 1977, 5.4 quintals of feed units were expended per quintal of product and last year -- 5 quintals of feed units. Compared to kolkhozes in Uvinskiy Rayon and throughout the republic as a whole, less feed is used per unit of output at the complex.

The process of issuing feed has been mechanized. Only in the quarantine pigsties is damp feed supplied to the animals manually. As it arrives the feed is poured into a receiving hopper and thereafter into a storage hopper, one of which is installed near each technological line. As a rule, a hopper contains a 2-day supply of mixed feed. The feed is poured ihto the storage hoppers through hatches. Initially the first hopper is filled up and thereafter the remaining ones are successively filled.

The KKK-1000M automatic feed distributor has two feed lines made out of steel pipe. They are installed in a manner such that the animals are unable to touch them. Fifteen minutes prior to the feed being issued, the electric lighting turns on automatically for a period of 60 minutes. During the remaining period, when the animals are resting, auxiliary lighting prevails.

Feed is assimilated well by the animals when the daily routine is observed. Thus the feeding is carried out at definite times and on a very strict basis: at 0400, 0800, 1200, 1600 and 2000 hours.

There are two feed distribution systems for a quarantine regime. Damp feed is supplied to the feeding troughs through pipes installed in the sections. Dry feed is placed on the floor just as in the fattening pigsties. On each occasion the feed is supplied in three small portions, standardized for each group of animals. The amount of feed issued by each batcher to a group of animals (from 1 to 4 kilograms) is controlled by special baffles. The feed norm required by the animals during one feeding is supplied during three working cycles. This norm is increased as the animals grow in size. The time expended for one feeding amounts to 20-30 minutes. Feed losses are almost eliminated when such a standardized feeding regime is employed.

For a large portion of the day the fattening department is darkened and thus there is very little movement among the animals, their live weight increases at a more intensive rate and with reduced feed expenditures and, in addition, an economy is realized in the use of electric power.

Great importance is attached to ensuring that the task of supplying the swine with fresh water is properly organized. The water should be at a temperature of plus 12-15 degrees. The animals drink out of automatic watering bowls which are located in the defecation zone, so as to preclude the possibility of the dampness reaching their rest areas.

Special platforms with sloping floors have been installed in the resting and feeding areas for the swine. The manure is pushed through the slotted floors by the hooves of the animals into manure-receiving canals.

Experience has shown that the resting platforms are maintained in tidy condition. It is not necessary to remove the manure in a pigsty of this type, since it is periodically washed away.

The pigsty is equipped with a ventilation system having heating-ventilation units which provide automatic control over the microclimate regime. During the winter, fresh air is warmed to the required temperature in advance prior to being delivered to the pigsty. Electrical heating elements are employed for heating the premises. The temperature regime is also maintained automatically.

Fresh air is supplied by means of pipes installed in the ceiling. The contaminated air, by means of excessive pressure created by a forced-flow system of ventilation, is removed from the premises with the aid of "Klimat" type units.

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[Dec 79, pp 4-7]

[Text] Economics and Prospects

When evaluating the efficiency of agricultural production, attention is usually focused on its volumes and economic indicators. The summary indicators of economic efficiency include labor productivity, output production costs, profit and production profitability. The dynamics of production at the complex during a 2 year period can be followed using Table 1.

TABLE 1

Economic Efficiency of Pork Production

Indicators	1977	1978
Increase in live weight of swine, in tons	324	888
Production cost per quintal of output in live weight, in rubles	101.4	96.6
Profit, thousands of rubles	250	677
Profitability, in %	36.0	41.1

It is apparent from the Table that pork production increased by more than 2.7 times during this period. Production expenses during 1977 amounted to 328,000 rubles and last year -- 859,000 rubles. Thus production expenses increased by 2.6 times and output volume -- by 2.74 times. The production cost for a quintal of increase in live weight decreased by 4.7 percent.

Let us now look at labor productivity. When the personnel complement was increased by 20 individuals, or by 1.5 times, labor productivity increased by 1.8 times and the salary of one worker by only 1.2 times. Such a ratio can only be welcomed (see Table 2).

Production cost is an important economic indicator for describing the operation of an enterprise. Compared to the previous year, the production cost for an increase of 1 quintal in live weight during 1978 decreased by

4.7 percent and it was considerably lower than the level at kolkhozes in the rayon and throughout the republic (see Table 3).

TABLE 2

Growth in Labor Productivity

Indicators	1977	1978
Average annual number of workers	39	59
Total amount of time worked, in thousands of man-hours	72	125
Labor expenditures for producing 1 quintal of output, man-hours	7.7	5.1
Gross output (in comparable 1973 prices) per average annual worker, in rubles	13253	24056
Annual wages for 1 worker, in rubles	1769	1950

The largest item in the structure of expenditures is feed and at the complex this item is somewhat greater than that for kolkhozes in the rayon and throughout the republic. This is explained by the fact that the complex must purchase its concentrated feed on the side.

It also bears mentioning that wages at the complex constitute only 5 percent of the overall structure of expenditures, whereas in the rayon and republic it amounts to roughly one fifth of all expenses for the production of pork. This once again confirms the profitable nature of an industrial technology and its advantages.

TABLE 3

Production Cost for Quintal of Increase in Live Weight of Swine, in rubles

Farms	1977	1978
Uvinskiy Swine Raising Complex	101.4	96.6
Kolkhozes in Uvinskiy Rayon	257.8	266.6
Kolkhozes in the Udmurt ASSR	189.7	218.6

When organizing production on a cooperative basis, importance is attached to distributing correctly the profit obtained by the inter-enterprise facility. In conformity with the statute on an inter-enterprise facility (organization) in agriculture, approved by the USSR Council of Ministers, the profit obtained by an inter-enterprise facility, in accordance with a decision handed down during a meeting of the authorized representatives of the participating farms, is: placed at the disposal of the inter-enterprise facility for the purpose of making payment for long term credit and for paying the interest rate for the use of such credit, for the formation of funds for development, for material incentives and for socio-cultural measures and housing construction and also for covering losses sustained from the operation of housing and municipal services; for making payments into the budget. The remaining portion of the profit is distributed among the participating farms, taking into account their proportional payments and the amount of cattle and feed transferred.

As a result of the production-economic activity of the swine raising complex, 250,000 rubles of profit were realized in 1977 and in 1978 -- 677,000 rubles. Last year the profit was distributed in the following manner (see Table 4).

TABLE 4

Distribution of Profit in 1978

Distribution of Profit	Total, in thousands of rubles	Percentage
Repayment of bank credit	100	14.8
Fund for development of enterprise	39	5.7
Material incentive fund	38	5.6
Fund for socio-cultural measures and housing construction	6	1.0
Replacement of circulating capital	100	14.8
Other distributions	26	3.8
To participating farms	368	54.3
Total amount distributed	677	100

The distribution of profit among those rayons which supply young swine is carried out taking into account three factors: proportional participation; livestock supplied for fattening; quantity of feed (see Table 5).

TABLE 5

Overall Total of Output Expenditures, thousands of rubles

Rayon	Share Participation	Live Weight Sold	Cost of Feed	Total Amount of Expenses
Uvinskiy	372	1428	275	2675
Syumsinskiy	-	556	114	670
Vavozhskiy	-	317	61	378
Selinskiy	-	21	4	25
Total	372	2322	454	3148

Hence a profit of 11.7 kopecks is realized for every ruble of expenditure. Consequently, it is not difficult to compute the rayon in which the greatest amount of profit will be obtained by the farms. The supplier-kolkhozes in Uvinskiy Rayon distributed 242,500 rubles or 65.9 percent of the profit among themselves and for their neighbors in Seltinskiy Rayon -- 2,900 rubles or 0.8 percent. The profit was distributed in a like manner among the participating farms. After the expenses for constructing the swine raising complex have been fully paid off, all of the profit, minus withholdings for production activity, will be distributed to the participating farms.

One of the most important indicators of the operational efficiency of an enterprise is its profitability level. In 1977, this indicator was 36 percent for the complex and in 1978 -- 41.1 percent. At the same time, last year the kolkhozes in Uvinskiy Rayon sustained losses amounting to 180,900 rubles from their pork production operations. And it was only efficient operations on the part of the complex that enabled the kolkhozes to correct the situation, after having first raised the average level of profitability to 20.2 percent. And this will promote an equalization of the economic level of the farms and provide them with equal opportunities for expanded reproduction.

Based upon the above, the conclusion can be drawn that the creation of an inter-enterprise facility is a progressive and promising undertaking from an economic and socio-production standpoint, provided well thought out solutions can be obtained for an entire series of mutually related problems. This is a proper statement to make based upon the 2 years of operational experience accumulated by the complex. However, certain unfinished tasks must be taken into consideration in the future. For example, the practice of staffing the complex using animals drawn from farms in several rayons has not proved its worth. The capability of the complex has not been utilized fully owing to a shortage of animals. According to the plan, the annual capability of the complex is 24,000 head. Actually however, in 1977 it operated at only 23 percent of this capability and in 1978 -- at 46 percent.

This hear, commencing during the middle of the summer, eight of the republic's rayons will participate in the work of staffing the complex with animals. This situation will in all probability continue until such time as a new reproduction department is built. We believe that this represents the best solution for the problem. But then it will be necessary to organize the supplying of feed by shareholder-farms.

For a closed cycle for pork production, dry concentrated feed is required for the animals and also damp mixtures for the suckling pigs. Their preparation requires coarse-milled grain (barley) and succulent and green feed. Thus the necessary land areas are presently being set aside for the growing of forage crops. Consideration is also being given to the problem of converting workers over from a time rate to a piece rate for wages, thus raising their material interest.

Inter-enterprise livestock raising facilities have been operating successfully in our country for more than 15 years. But by no means are their advantages being utilized fully. Some leaders and specialists believe that production cooperation is not required for large-scale and economically strong farms. Such a point of view is basically incorrect, since small low-productivity branches are always to be found even at large farms. Experience reveals that cooperation is equally advantageous to large and small and economically strong and weak farms, in those branches where there is a low level of production concentration and thus no opportunity for employing an industrial technology or scientific and engineering achievements.

Another mistake lies in the fact that many farm leaders fear that they will be left without feed for their own animal husbandry operations, since they are required to transfer a definite portion of this feed to the inter-enterprise complex. However, it must not be forgotten that feed consumption per unit of output is as a rule considerably lower at inter-enterprise facilities than it is on farms and thus the economic effect is greater.

At the present time, 80 percent of the kolkhozes and sovkhozes in the Udmurt ASSR are participating in swine raising operations. In the future it will be concentrated at sovkhozes of the Svinoprom Trust. The principal pork production operations are concentrated in the central and southern rayons of the republic.

During the July (1978) Plenum of the CPSU Central Committee, L.I. Brezhnev commented: "In recent years, a great deal has been accomplished in connection with introducing progressive technologies into pork production operations. Large-scale swine raising enterprises have been created at sovkhozes and kolkhozes and on an inter-enterprise basis. Their operational experience reveals that the conversion over to industrial methods for producing pork is making it possible to raise the weight gains and shorten the fattening periods and to obtain output with minimum expenditures of feed, labor and resources."

What are the prospects for developing the swine raising branch in the Udmurt ASSR? In addition to the Uvinskiy Rayon inter-enterprise facility, there are two other industrial complexes in operation in the republic -- at the Pychasskiy and imeni Lenin sovkhozes. Each has a planned capability for handling 24,000 head annually. The plans for the next five-year plan call for the placing in operation of swine raising complexes at the Kigbayevskiy Sovkhoz in Sarapul'skiy Rayon (for 24,000 head and for the production of 2,500 tons of pork annually) and at the Baninskiy Sovkhoz in Votkinskiy Rayon (for 108,000 head and an annual capability of 12,600 tons).

Concentrated feed will be supplied to these complexes on a centralized basis. They will be located near cities and thus the plans call for the extensive use, for fattening purposes, of food remnants from public catering establishments.

Prior to the end of this current five-year plan, five more swine raising complexes will enter operations: at the kolkhozes imeni Zhdanov in Debesskiy Rayon, imeni Frunze in Yak-Bod'inskiy Rayon, Iskra in Malopurginskiy Rayon, Krasnoye Znamya in Alnashskiy Rayon (for 6,000 head) and imeni Lenin in Karakulinskiy Rayon (for 12,000 head).

Thus, during this current five-year plan, six swine raising complexes will commence operations in the republic and carry out their production operations on an inter-enterprise basis. Sixty thousand swine will undergo fattening at these complexes annually. And by the end of the Eleventh Five-Year Plan the capability of the ten swine raising complexes (taking into account those already existing and those planned for construction) will reach 240,000 swine.

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REGIONAL DEVELOPMENT

APPLICATION OF LIQUID MULTICOMPONENT FERTILIZERS IN BELORUSSIA

Minsk SEL'SKOYE KHOZYAYSTVO BELORUSSII in Russian No 4, Apr 80 p 22

[Article by I. N. Andreyanshchenko, chief of the Chemical Supply Directorate of Belagrochemistry; V. S. Andrushchuk, senior scientific associate at the Central Scientific Research Institute for Rural Mechanization and Electrification of the Nonchernozem Zone of the USSR; and G. V. Vasilyuk, director of the Soil Study and Agrochemical Laboratory at the Belorussian Scientific Research Institute; in the column "Mechanization": "Liquid Multicomponent Fertilizers. How to Apply Them to the Soil."]

[Text] Last year liquid multicomponent fertilizers (LMF) began arriving in Belorussia. They bore the trademark "10-34-0," containing 10 percent nitrogen and 34 percent phosphorus. The great interest shown in them was prompted mainly by the possibility for complete mechanization of all related processes and for equal distribution of the product in the soil. Since there is no free ammonia in LMF, they can be applied directly to the surface of a field and later be embedded with any soil tilling equipment. Practically no nutritive substances are lost when transferring the fertilizer from one container into another or when filling machinery. If essential, microelements, certain pesticides, and growth stimulants may be added to these fertilizers.

Today many rayons in the republic are experiencing positive results from their work with LMF. During just the very brief spring planting season of 1979, the farms in Berezinskiy Rayon were able to continuously receive, process and apply more than 5000 tons of the basic solution of "10-34-0" and obtained good results from it.

It is recommended that LMF be stored for no longer than 6 months, since the isomers of P_2O_5 decompose under longer storage. This leads to the formation of an insoluble precipitate. The basic solution can also form a precipitate during the summer if the air temperature is above the critical point. Therefore, the surfaces of storage containers must be protected with a thermal and light-reflective coating.

Following winter storage (and prior to application) the LMF must be quality checked, since it is possible that a certain number of yet undissolved crystals may be found suspended in the solution. Most of them gradually dissolve on their own. However, in order to keep the sprayers from clogging up--as occurred at the Western Machine-Testing Station--they must be dissolved by mixing the crystals with the liquid ingredient. To do this the exhaust gases from a tractor are vented to the very bottom of the tank through a hose.

The republic will receive over 90,000 tons of LMF this year. The associations within Sel'khozkhimiya are assigned the job of accepting, storing, and applying them without loss and with minimal expenditures. With this in mind, it is planned to build railroad storage reservoirs with a capacity of at least 30,000 tons and to put them into operation. The surveying for a prototype design for 2000-ton railroad storage reservoirs--developed by the Tula branch of the State Institute for the Design of Plants for the Basic Chemical Industry--has, basically, been done, as has that for designs of 200- and 1000-ton railroad storage reservoirs done by the Sel'khoztekhproyeht Institute. But until they become operational, tanks with capacities of 25, 50, and 75 cubic meters will have to be used for storing the LMF that come from the Sel'khoztekhnika organizations; such tanks are available on the farms.

LMF are moved from the production plants to the railroad storage reservoirs in railroad tank cars. Organic fertilizer dispensers, tank trucks, and water dispensers may be used to transport them to storage sites on the farms and to the areas where they are to be dispensed. In order to transfer the basic solution to other containers, the sleeve of the filling arm of the spreader is connected to the pressure side of a pump through a mixing nozzle or cylindrical nozzle (with a diameter of 125 mm), which is attached in place of the conical cap of the dispensing device.

They can be transported in converted ARUP-8 powdered fertilizer spreaders, 1PTS-9 and 2PTS-12 trailers, and ZIL-130V1 or ZIL-133G1 vehicles equipped with detachable tanks. The rated capacity for the tanks of spreaders and tank trucks will be achieved if they are 70 percent filled. To prevent accidents during acceleration, braking, and turning the tanks are equipped with 4 mm thick sheet-steel dividing walls to reduce the liquid's dynamic stress; they have arc-like cut-outs in the upper and lower sections.

Converted liquid organic fertilizer spreaders, water dispensers, sprayers (RZhT-8; RZhT-4; ZZhV-1,8; VR-3; POU; OVS; OVT-1A; and others) and An-2 aircraft are currently used to dispense the basic solution. The surface application method is the most widespread; it provides for higher machinery productivity and allows for visual examination of the sprayer's operation. A local method is suitable for treating the soil between rows of ploughed crops, where the LMF's effect is somewhat greater and where it proves advantageous to apply fertilizer jointly while performing other operations.

Because of inadequate reservoir capacity, the POU with the OPT-15 arm can treat only 28-30 hectares per shift, but in practice many utilize reservoirs of greater capacity. Thus, when POU equipment is mounted on OVT-1A vehicles, the shift productivity figure increases to 55 hectares; on the ZZhV-1,8 and the OVS-A--to 65; on the VR-3 and RZhT-4--to 70-75; and on the RZhT-8--to 85 hectares. Sprayer arms are attached to the extension arm bracket of the vehicle's frame or in front of the tank on the tractor's hinge. The reservoirs and equipment must be washed with water and their condition checked daily, after work.

Arms developed by local farm innovators and by special sections are widely used. Thus, Berezinskaya Rayonsel'khoztekhnika has fashioned them from 32-mm pipe for RZhT-8 spreaders and from 25-mm pipe for VR-3 water dispensers. To reduce the arm oscillation and breakage, they use a rope support and hold it with side braces. The arm's length is 8-10 or 14-16 meters. Special deflector sprayers with 3-mm apertures are fitted to the arms at 1.4-meter intervals.

The Central Scientific Research Institute for Rural Mechanization and Electrification of the Nonchernozem Zone of the USSR has developed a small-dimension device for use in applying LMF with RZhT-4 and RZhT-8 spreaders; it provides for a breadth of coverage of 15-23 meters.

The technology used in applying the basic solution depends on the availability and characteristics of vehicles for transporting and applying the fertilizer to the soil and on the distance of the fields from the storage reservoir. Direct flow equipment should be employed when using the POU for areas with radii of up to 3 km; the OVT-1A, ZZhV-1,8 and OVS-A for up to 5-6 km; the RZhT-4 and VR-3 for up to 10 km; and the RZhT-8 for up to 15 km.

Last year An-2 aircraft, which can cover 180-240 hectares per shift, dusted our farms with a large quantity of the basic solution. The periods for applying LMF and the dosages employed (in terms of the amount of active material used) are the same as for hard mineral fertilizers. Fall treatment of light soils with the basic solution is not nearly as effective as spring treatment, because of partial washout of the nutritive substances. In terms of dosage by weight, 100 kg of the basic solution contains 10 kg of nitrogen and 34 kg of phosphorus.

Consequently, 250-300 kg of the basic solution per hectare should be applied to soil planted with potatoes, sugar beets, feed roots, and corn, while 22 kg per hectare should be used for other crops. The amount of nitrogen and potassium lacking must be applied as hard fertilizer, with the greater portion of the potassium fertilization being done in the fall (for ploughed crops). The agrochemical effectiveness of equivalent doses of the nutritive substances in LMF and hard mineral fertilizers is practically identical.

The use of LMF permits us to fully mechanize on- and offloading operations and, when compared with solid fertilizers, to reduce our expenditures for production and use by 10-20 percent, and those for labor by 30-35 percent.

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TILLING AND CROPPING TECHNOLOGY

BASHKIR AGRICULTURAL SCIENTISTS REVIEW PROGRESS, PLANS

Saratov STEPNYYE PROSTORY in Russian No 1, Jan 80 pp 15-18

[Round table discussion by Professor N. R. Bakhtizin, Honored Scientist of the Bashkir ASSR and director of the Scientific Research Institute of Agriculture, candidates of agricultural sciences I. G. Gibadullin and B. P. Shilenko, senior researcher I. F. Yusupov, and B. R. Vdovin, chief of the division of seed raising at the Elite Seed Raising Trust, conducted by V. Mel'nikov: "Put All Reserves into Action"]

[Text] The farm workers of the Bashkir ASSR worked hard last year. Despite difficult weather conditions they raised and harvested a pretty fair crop. The yield was 15.9 quintals of grain per hectare with a gross harvest of more than 4.9 million tons. The farms in Khaybullinskiy Rayon made a major contribution to republic grain production. They fulfilled their stepped-up socialist obligations and sold 160,000 tons beyond them.

The kolkhozes and sovkhozes also shipped about 1 million tons of sugar beets, 220,000 tons of potatoes, 101,000 tons of vegetables, and 35,000 tons of sunflower seeds to receiving points. A sound foundation was laid for this year's crop. Comrade L. I. Brezhnev took note of the achievement of the Bashkir ASSR in his talk at the November 1979 Plenum of the CPSU Central Committee.

There is reason to be proud. But there is also reason to ponder. Now, when the results are in, it is time to analyze them carefully and outline ways to continue development of the republic's agricultural sector, for progress must continue. This was the subject of a STEPNYYE PROSTORY round table conducted by V. Mel'nikov. The participants were Professor N. R. Bakhtizin, Honored Scientist of the Bashkir ASSR and director of the Scientific Research Institute of Agriculture, candidates of agricultural sciences I. G. Gibadullin and B. P. Shilenko, senior researcher I. F. Yusupov, and B. R. Vdovin, chief of the division of seed raising at the Elite Seed Raising Trust (from left to right in photographs [not reproduced]).

[N. R. Bakhtizin] Last year was a hard one for most of the agricultural regions of the Bashkir ASSR because of climatic conditions. The prolonged winter cold, late spring, and drought in May and June had a negative impact on the wintering and spring-summer development of winter crops. A hot dry wind ["sukhovey"] during the period of grain ripening and atmospheric drought in August sharply reduced the yield of spring grain crops, especially in sectors that were planted late. Nonetheless, more than 3 million hectares of grain crops were harvested in the republic with a comparatively good yield. But analysis of the work of experimental farms and leading kolkhozes and sovkhozes shows that the level of yield in the republic could have been much higher if the recommendations of scientific institutions concerning the technology of raising agricultural crops had been followed in all places. For example, the experimental farms of the Bashkir Scientific Research Institute of Agriculture harvested an average yield of 28.5 quintals per hectare on an area of almost 12,000 hectares. The Baymak experimental farm got 33 quintals per hectare. Similarly high yields were harvested at the Kolkhoz imeni Kuybyshev in Ilishevskiy Rayon, Pobeda Kolkhoz in Karmaskalinskiy Rayon, the Kolkhoz imeni Salavata in Sterlitamakskiy Rayon, and the Unysh Kolkhoz and the Kolkhoz imeni 50-Letiya Bashkirskov ASSR in Dyurtyulinskiy Rayon. In certain fields the yield reached 40-50 quintals per hectare. This is where our hidden reserves lie.

[Question] Nazif Rayanovich, introducing an optimal structure of planted areas is an important job in crop farming. Does the structure correspond to the natural and economic conditions of the particular zones and regions of the republic, and are the advances of plant breeding, agricultural chemistry, and other branches of agronomy taken into account in this?

[Bakhtizin] There are several problems which occur in determining the structure of planted areas. In recent years the area planted in winter crops, in particular winter rye, has been unwisely curtailed. Moreover, the proportion of peas is still low, especially in the Subural and Transural steppes, and plantings of barley, a valuable forage crop, are being expanded slowly.

An increase in the area of clean fallow is required for winter rye. The lack of fast-maturing fallow-occupying crops results in late harvest of crops on clean fallow land. Therefore, soil preparation for winter crops is done right before planting. According to long-term data, this is a period of very low precipitation: 15-40 millimeters in July and 4-40 millimeters in August, so almost every year there is a moisture deficit reaching 50-60 percent on occupied fallow land. As a result, by the time that winter crops are planted, because of late tillage there is an extreme shortage of moisture and nutrients in the soil. The seeds are often placed in loose, unsettled soil, which leads to unsatisfactory overwintering. It is no accident that when winter crops are planted after late occupied fallow land, almost every year significant areas have to be replanted. Therefore, it is extremely important to increase the area of clean fallow in the republic. Not too long ago we had 450,000-500,000 hectares, but in recent years it has been cut in half. We must expand clean fallow to its former dimensions. Introduction of the high-yield Chulpan winter rye variety, which requires a good agricultural setting, also requires this.

It would not be correct, however, to recommend that winter crops be planted only after clean fallow. There are many farms which get pretty good yields of these crops from well-tilled occupied fallow. This is especially true in the southern and northern forest-steppe zones.

In addition to winter crops spring grain crops occupy large areas. In some regions plantings of spring wheat could be somewhat reduced with a corresponding increase in the production of higher-yielding peas, oats, and barley. It needs to be noted that the varieties of spring wheat do not always correspond to conditions, and in some places this crop is affected by late fall freezes and produces poor quality grain (especially in the northern forest-steppe zone).

Natural conditions do not permit high yields of millet, so it is advisable to plant buckwheat in its place. Buckwheat plantings should be concentrated in the rayons that are most favorable for it with respect to soil and climate, that is Chishminskiy, Fedorovskiy, Chekmagushevskiy, and Dyurtyulinskiy rayons. In these rayons the buckwheat yield is 16-20 quintals per hectare in good years while the republic average is 10-12 quintals. Specialization and concentration of buckwheat raising, and also of sugar beets and sunflowers, will help raise their yields.

[I. G. Gibadullin] The average grain yield in the republic last year was 5-6 quintals lower than expected. At the same time, under identical soil and climate conditions many rayons receive 20-25 quintals of grain per hectare. The experimental farms of the Bashkir Scientific Research Institute of Agriculture have already been mentioned. Six rayons got more than 20 quintals of grain per hectare (Ilishevskiy — 24.8, Karmasklinskiy — 23.0, and Khaybullinskiy — 22.0). Five rayons were in the 17-20 quintal per hectare range, 17 had yields of 15-16 quintals, and the yield was less than 15 quintals per hectare in 28 rayons.

Crop rotations are the foundation of stable harvests. No other farming procedure matches them for breadth and diversity of effect on the soil and the plant. At the Ufa experimental model farm, for example, the spring wheat yield was 10.8 before crop rotations were introduced, and at the beginning of the fourth rotation it had risen to 26.1 quintals per hectare. In 1979 it was 31.

Tests at the Bashkir Agricultural Institute have shown high yield stability in drought years. For example, the yield of winter rye planted continuously was 2.9 quintals per hectare in dry years while the yield in crop rotations was 28.9; corresponding figures for spring wheat were 6.8 and 20.5 quintals. This rule is confirmed by the experience of many kolkhozes and sovkhozes in the republic. For example, the Order of Lenin Matrayevskiy Sovkhoz in Khaybullinskiy Rayon had grain yields of 10-11 quintals per hectare before incorporating crop rotations; in recent years they have consistently gotten 25-26 quintals per hectare.

It is very important to observe a correct alternation of crops in the rotation. At the Baymak experimental farm in the Transural steppe spring wheat planted for a second year after wheat reduced the yield by 4.1 quintals, and when planted in the third year it decreased yield by 9.3 quintals. In the forest-steppe zone, at the Birsk experimental model farm, repeated planting of spring wheat decreased the yield 9.8 quintals where the yield after rye crops was 22.8. The republic loses a large amount of grain from this one practice, repeated planting of wheat.

At the present time, 320 farms have 10-year-old land use plans, 190 have plans 15 years old, 224 have 20-year-old plans, and the plans at 60 farms are more than 20 years old. The land use planning service must be strengthened and work done at 10 percent of the farms each year, so that all land use plans will be brought up to date in 10 years. Farms which have crop rotations that are 15-20 years old must repeat the agronomic studies to substantiate them. Furthermore, successful introduction and incorporation of crop rotations demands that the plantings of spring wheat in the crop structure be reduced somewhat with a gradual increase in the area planted to winter crops, green forage crops, and peas. More land in clean fallow must be envisioned, especially in the steppe and beet-growing regions; the amount of clean fallow in the republic must be raised to 10 percent of arable land.

[Question] Which of the antidrought farming practices being used appear to be most important?

[I. G. Gibadullin] It is essential for better moisture accumulation in the soil to create a thick plowing horizon by deep tillage and plowing with a subsoiler on soils with a thin humus layer. The average gains in yield with deep plowing over a number of years have been as follows: spring wheat — 2.3 quintals per hectare, winter rye — 3.0, winter wheat — 3.5, millet — 4, and oats — 3 quintals. Deep plowing can be used on 1 million hectares in the Bashkir ASSR.

Preplanting soil tillage before grain crops naturally aims at maximum moisture preservation by leveling the field surface and shallow preplanting cultivation with mandatory rolling after planting. Spring and summer tillage of bare and early fallow as weeds appear is done by periodic cultivation to a depth of 5-8 centimeters with simultaneous harrowing and subsequent rolling. On occupied fallow the best procedure is not plowing, but rather two or three surface tillings with shallow disk plows. According to figures from the Birsk experimental model farm, disking occupied fallow three times gives a 2.1 quintal per hectare gain in yield of winter rye compared to plowing over with a mold board.

Tillage without a mold board and leaving the stubble has worked well. It is recommended for the arid, relatively snow-free regions of the Transurals and Suburals. In drought years it increases the moisture supply by 25-30 percent and raises grain yield by 5-6 quintals. Nonetheless, the area of mold board-less tillage is still small, just 400,000 hectares. The introduction of the soil-protective farming system is being inhibited by the shortage of special antierosion equipment. For example, the available number of stubble planters can only handle 10 percent of the land tilled without mold board.

The optimal planting time for winter crops is 10-12 August in the forest-steppe zone and 15-25 August in the steppe zone. When there is not sufficient moisture in the plowing horizons it is wise to leave dessicated fields after occupied fallow for spring wheat planting. Early grain crops must be planted early and fast so that they can make full use of fall-winter moisture supplies and produce even sprouts. In 1979 wheat planted on 6 May at the Baymak experimental model farm produced 31 quintals per hectare, while wheat planted on 15 May yielded 25.8 and wheat planted on 25 May produced just 20.6 quintals per hectare.

[B. R. Vdovin] It is inconceivable to get stable yields without well-organized seed growing. Last year 99.7 percent of the grain crops in the republic were planted with varietal seeds and 100 percent of the spring wheat and peas were. The use of new regionalized and promising varieties increased. Let me give examples. In 1977 9,200 hectares was planted in Chulpan winter rye, but in 1979 the figure was more than 154,000. Plantings of Moskovskaya 35 spring wheat have risen from 3,300 to 104,000 hectares. In 1977 the high-yielding oat variety Astor was planted on 18,000 hectares, while in 1979 it was planted on 271,000.

The grain farmers of Ilishevskiy, Karmaskalinskiy, Dyurtyulinskiy, and several other rayons have achieved good indexes for introduction of high-yield varieties.

[Question] Precisely what varieties are the farmers of Ilishevskiy Rayon, for example, planting?

[B. R. Vdovin] Ilishevskiy Rayon plants nothing but regionalized varieties in its grain fields. They are planting more of the new high-yield spring wheat variety Moskovskaya 35 than any other rayon in the republic, 9,500 hectares. They have 6,300 hectares of Astor oats, 15,400 hectares of Chulpan winter rye, and 2,100 hectares of Al'bidum 114 winter wheat.

Unfortunately, not all regions are giving proper attention to the introduction of new varieties. Ishimbayskiy Rayon is one, for example. They are still planting Union barley and Pobeda oats. In Ufimskiy Rayon large areas are planted in unregionalized barley varieties.

The accepted scheme of variety renewal for grain crops envisions seed renewal on one-third of the seed plots each year. The scientific institutions of the republic must sell the seed farms 100,000 quintals of high-grade seeds for this purpose. One of the chief jobs of the experimental farms of the Bashkir Scientific Research Institute of Agriculture is to provide the seed farms with elite seeds for all agricultural crops.

The institute's farms had a fairly good crop last year. The new varieties provided a significant gain in it. The Mechetlinskiy experimental model farm harvested 30.6 quintals per hectare of Moskovskaya 35 spring wheat (the old regionalized variety Saratovskaya 33 produced 28.4 quintals). At the Birsk experimental farm the new Nosovskiy 9 variety of spring barley produced 32.1 quintals per hectare compared to just 24.8 for the Nosovkiy 6 variety regionalized earlier. The gain in yield was 7.3 quintals.

The institute's production of stable crops is a reliable guarantee that the kolkhozes and sovkhozes of the republic will be supplied with seeds of regionalized varieties.

The seed farms received more than 23,000 quintals of elite winter crop seeds from the experimental model farms from the 1979 harvest. This included more than 9,000 quintals of the high-yield Chulpan winter rye variety and 8,000 quintals of Al'bidum winter wheat. At the present time elite spring crop seeds are being prepared for sale to the kolkhozes and sovkhozes. The institute's experimental farms fulfill their plans for sale of elite grain seeds each year. However, there are still a number of kolkhozes and sovkhozes in the republic that plant low grade seeds.

[Question] Why are there such farms?

[B. R. Vdovin] In my opinion, a great deal here depends on the level of work by the specialists at the particular farm. Only those farms where the agronomist gives enough attention to questions of seed growing will always have high-yield varieties of high reproductions.

I should also mention that while the institute has done fairly well in the production of elite grain seeds it does not fulfill its plan for sale of perennial and annual grass seed. This applies particularly to alfalfa, clover, and sainfoin.

[Question] What steps are being taken to straighten out the problems in grass seed growing?

[B. R. Vdovin] One of the chief steps in this area is to move quickly to specialize the Ufa experimental model farm in production of perennial and annual grass seed. The primary material-technical base will be concentrated at this farm. Flow lines to clean and dry grass seed will be installed and scientific researchers will study seed growing for feed crops. Irrigated fields are being set up at all experimental farms that raise grass seed. Additional seed beds are being put in, the application of mineral fertilizer for grass is increasing, and progressive technology for seed preparation and drying is being introduced.

[Question] Boris Petrovich, you have a great deal of work experience in the field of agricultural chemistry. It would be interesting to hear your views on the development of the use of chemicals in farming in the Bashkir ASSR and available reserves with respect to the use of fertilizer.

[B. P. Shilenko] The use of fertilizers at Bashkir kolkhozes and sovkhozes substantially raises the yield of grain crops. But better results could be obtained from their use. Stricter agronomic checks are needed on their use.

For the 1979 harvest winter crops were planted with simultaneous application of granules on 410,000 hectares, almost 70 percent of the total area planted. Spring top dressing with mineral fertilizers for the plants is done extensively at the farms. In addition to aerial application root feeding is used. This involves using disk planters to apply the fertilizer to mature soil; the fertilizer is covered over to a depth of 4-5 centimeters across the rows. Tests made on leached chernozem soils at the Ufa experimental model farms showed that application of 90 kilograms of urea per hectare (40 kilograms of nitrogen) spread on the soil surface produces a gain in yield of winter rye of just 1.5

quintals, while applying the same amount of fertilizer with a disk planter raises the yield by 3.4 quintals.

Last year spring fertilization of winter crops was carried out on all surviving fields in the republic, 415,000 hectares. Of this 214,000 was done by root feeding. With aerial application the fertilizer is often spread unevenly because of overlapping of neighboring strips and wind blowing fertilizer onto neighboring fields. Superphosphate granules are sometimes spread by air, whereas they should be applied to the rows during planting. Special planters with corrosion resistant fertilizer boxes and seeding coils are needed for broad use of root feeding, but we do not have them at the present time.

Farms which apply superphosphate granules when planting winter crops and nitrogen supplemental feeding in the spring get good grain yields. The Rodina Kolkhoz in Ufimskiy Rayon used its fertilizer in this way and harvested 20.2 quintals of winter rye and 23.6 quintals of winter wheat per hectare in 1979.

Many farms use several forms of fertilizer for winter crops. They apply 25-30 tons per hectare to fallow fields, superphosphate or ammofos granules to the rows, and urea as supplemental feeding. As a result the yield of winter rye increases 6.7 quintals per hectare. The Ufa experimental model farm used fertilizer in this way on its production fields in 1979 and this helped it get an average yield of 32.5 quintals per hectare of the intensive winter rye variety Chulpan while the Baymak experimental model farm, located in the Transural region, harvested 33.5 quintals.

Nonetheless, organic fertilizer is not combined with mineral fertilizer yet for all winter crops. Manure was applied on only one-third of the 1979 crop area. Some farms plow it in too late, spread it unevenly, and do not get proper results.

Spring grain crops (wheat, oats, barley, and millet) in the Bashkir ASSR also respond well to row application of mineral fertilizer. The Ufa experimental model farm, where mineral fertilizers were applied before planting and to rows during planting, got 37.7 quintals per hectare of the intensive oat variety Astor. The Shemyakskiy Sovkhoz in Ufimskiy Rayon, where fertilizer was applied in the rows over most of the oat area, harvested 23.7 quintals per hectare of this crop.

For the republic as a whole, granulated mineral fertilizers were applied to grain crops in rows on 2,160,000 hectares in 1979. According to calculations by the republic chemicalization station and the Bashkir Scientific Research Institute of Agriculture, the additional grain harvest from this procedure is about 4 million quintals. It could be even greater, but in some cases farmers who have begun planting with granules later forget to refill the planters. When the fields sprout it is obvious from the condition and color of the plants where the fertilizer was applied and where it was not.

The local strip method of fertilizer application assures that mineral fertilizer spreads evenly. This method is beginning to be introduced at the kolkhozes and sovkhozes of the republic. In 1979 it was used to apply mineral fertilizers to grain crops on 90,000 hectares, employing old disk planters for this purpose. To prevent moisture loss local fertilizer application should be combined with cultivation or planting. But the process of designing such machines is taking an unforgivably long time, and the experimental models of combined planters that have been produced do not provide the necessary depth differential in placement of seeds and granules.

[M. F. Yusupov] I would like to discuss the questions of productive use of machinery and preventing harvest losses.

A powerful energy base has been established in the countryside and agriculture has a growing stock of technical equipment. The output of the power installations working in agriculture in the republic today is about 7 million horsepower. The kolkhozes and sovkhozes operate more than 36,000 tractors, 16,000 grain harvesting combines, 19,000 trucks, and a great deal of other farm machinery. We have 160 horsepower of energy capacities per 100 hectares of arable land and 16 horsepower per worker. The qualitative composition of the fleet of machines and tractors has changed radically. In 1970 the average tractor had 57 horsepower, whereas today it is more than 70.

Although agriculture has been supplied with new equipment and the capital-output ratio has increased, the conditions of machine operation are virtually unchanged even though the new machinery requires a higher level of organization in its use and maintenance.

At the present time the actual use coefficients of shift time are 0.62 for plowing, 0.63 for moisture retention, 0.46 for grain planting, 0.43 for grain mowing, and 0.42 for grain pick-up, instead of the quota figures of 0.79, 0.70, 0.66, 0.68, and 0.65. Output norms are not fulfilled, which in turn leads to a decrease in the use efficiency of machinery as a whole and to delay in performance times for field jobs. Thus, the prime cost of one hectare of standard plowing rose from three rubles 80 kopecks in 1970 to four rubles 79 kopecks at sovkhozes and four rubles 21 kopecks at kolkhozes in 1979.

One of the reasons for the rise in the prime cost of mechanized work is the large number of major and current repair operations, not always justified, performed on tractors and combines. In this respect, an important element in raising the productivity of the machine-tractor fleet and reducing the prime cost of one hectare of standard plowing is introducing diagnosis without dismantling, specialized technical servicing, and operational control of the work of the fleet, which makes it possible to raise the productivity of a machine-tractor aggregate as much as 25 percent with a significant decrease in equipment repair costs. However, this method is not being introduced on the scale needed by production. The reason is that the farms do not have the needed instruments and equipment for diagnosis.

It is common knowledge that increasing the length of work by tractor aggregates and combines each day and rational use of time within the shift is a major reserve for raising shift and daily output of these units.

[Question] How is this reserve being used in the republic?

[M. F. Yusupov] The daily work time of grain harvesting combines in the field, depending on the zone, is 12-14 hours in the northern and northeastern forest-steppe and at least 20 hours in the steppe zone. The actual time of combine work among leading machine operators goes even higher. In R. Kh. Yakhin's team at the Zilairskiy Sovkhoz (the team has four Niva combines), daily work time is 20-22 hours. Many machine operators in the republic do this and get a high daily output per combine. At the same time, the shift coefficient and coefficient of use of shift time are still low at many farms because the quantitative composition of the machine-tractor fleet does not fit the organizational form for its use and servicing.

[Question] What is the attitude of grain growers toward flow technology for harvesting grain crops?

[M. F. Yusupov] Flow technology has been adopted at all farms in the republic. Introduction of the Ipatovskiy method of harvesting grain crops enabled leading farms to raise the coefficient of use of shift time from 55-60 to 80-85 percent. In R. Kh. Yakhin's team, for example, this coefficient reaches 85-90 percent. Thanks to correct organization of labor and skillful use of machinery the daily output of a combine at the Zilairskiy Sovkhoz averages 19 quintals compared to the norm of 10.5, and R. Kh. Yakhin's team gets up to 40 hectares. The components of successful work by leading teams and farms are outstanding knowledge by each machine operator of the adjustment, control, and optimal working modes of the combine under weather conditions and precise scientific organization of labor.

Nonetheless, the daily output per grain harvesting combine at many kolkhozes and sovkhozes in the republic does not exceed five hectares. Downtime for technical reasons (up to 10 percent) and organizational causes (up to 15 percent) continues to be significant. The reason is often mistakes made in putting together the harvesting and transportation complex and failure to coordinate the work of combines and means of transportation; in addition, different types of vehicles with different levels of productivity are included in the same teams. All this leads to harvest equipment downtime, disruption of the rhythm and flow of work by harvesting equipment, and ultimately to a delay in harvesting and reduction in the yield owing to grain losses. Grain losses sometimes reach 10-15 percent of yield, especially for lodged and weed-infested grain. To reduce losses each farm must establish its harvest technology with due regard for the condition of the fields, select an optimal set of machines, prepare them well at the proper time, correctly set the beginning of selective and large-scale harvesting, and make use of the practices of leading machine operators with respect to productive use of the machinery. The seals of the joints of the combine thresher, harvester, and pick-up unit must be checked before harvesting.

The most common cause of grain losses during harvesting is failure to follow or incorrectly following recommendations on regulating grain harvesters with due regard for grain weight and weather conditions. Therefore, each machine operator of the team must be prepared for the job so that he will be able to harvest grain under any weather conditions and, when necessary, gather high-yield, low-growing, lodged, thinned, and weed-infested grain without allowing harvester, pick-up, and thrasher malfunctions.

[Closing Statement] The Bashkir ASSR successfully fulfilled the assignment of the CPSU Central Committee to sell 2 million tons of grain to the state in 1979. The agricultural workers of Aurgazinskiy, Ilishevskiy, Karmaskalinskiy, and Sterlitamakskiy rayons, who overfulfilled their four-year plan for state purchases of grain, sugar beets, sunflower, potatoes, and vegetables have earned profound respect and praise. The job of rural workers in the republic now is to make vigorous use of progressive practices and scientific advances in their work and try persistently to continue increasing the production of all types of agricultural products.

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TILLING AND CROPPING TECHNOLOGY

BASHKIR PARTY HEAD REVIEWS HARVEST ACHIEVEMENTS, PROSPECTS

Saratov STEPNYYE PROSTORY in Russian No 2, Feb 80 pp 2-6

[Article by M. Z. Shakirov, first secretary of the Bashkir Oblast CPSU Committee: "Personnel Training and Indoctrination -- a Party Job"]

> [Excerpts] In this issue of the journal we are publishing a selection of articles from the Bashkir ASSR. Last year farmers there harvested more than 4.9 million tons of grain. Comrade L. I. Brezhnev took note of the success of the Bashkir Autonomous Republic in his statement at the November 1979 Plenum of the CPSU Central Committee.

In agriculture the average annual value of gross output exceeded the level of the Ninth Five-Year Plan by 21.6 percent, while labor productivity at the kolkhozes and sovkhozes was 24 percent higher.

Advances were made in grain production: the structure of plantings was improved, the proportion of forage and legume crops increased, more high-yield regionalized varieties were planted, and the time required for field jobs was reduced while quality was improved. All these things promote larger gross harvests and an increase in the sale of grain to the state.

The average yield of grain crops in the last four years was 17.2 quintals per hectare as compared to 12.8 in the Ninth Five-Year Plan. Gross grain harvests rose 39 percent while sale of grain to the state was up 76 percent. In 1978 our farmers harvested a record grain yield of 20.3 quintals per hectare and sold 2.8 million tons of grain to the state. The challenge now is to raise average annual yield to 20-21 quintals per hectare. The achievements of workers in Ilishevskiy, Karmaskalinskiy, and Dyurtyulinskiy rayons show that this is a realistic goal; even last year, under unfavorable conditions, they exceeded these figures.

Sugar beets, potatoes, vegetables, and other farm products are being raised on a large scale.

The material-technical base of animal husbandry has been strengthened. The assignments for the first four years for state purchases of milk, eggs, and wool were fulfilled ahead of schedule and the livestock workers successfully accomplished their task for sale of meat also.

Implementation of the party and government's wise agrarian policy has created opportunities for increasing agricultural production. In 1976-1979 alone the kolkhozes and sovkhozes of the Bashkir ASSR received 14,800 tractors, 7,900 grain harvesting combines, about 6,000 trucks, and a great deal of other machinery. The farms hauled and applied 3.7 million tons of mineral fertilizers to plowed fields. In this time the capital-labor ratio of agriculture increased by 41 percent while the energy-labor ratio rose 31 percent. About 1.4 billion rubles has been invested in agriculture since the start of the five-year plan.

Agricultural laborers worked hard last year. Despite difficult weather conditions they raised and harvested a generally good crop. The yield was 15.9 quintals of grain per hectare and the gross harvest was more than 4.9 million tons. Farms in Khaybullinskiy made the largest contribution, fulfilling their stepped-up socialist obligations and selling 150,000 tons of grain beyond them. Similar outstanding performances were seen in Baymakskiy (125,000), Sterlitamakskiy (98,000), Ilishevskiy (81,000), Aurgazinskiy (70,000), Karmaskalinskiy (56,000), and Dyurtyulinskiy (55,000 tons) rayons. Moreover, the workers of Duvanskiy, Iglinskiy, Karaidel'skiy, Askinskiy rayons met their socialist obligations. The farmers of Duvanskiy Rayon sold more than 45,000 tons of grain to the state for the first time and set a good example for the entire northeastern part of the republic.

The republic successfully fulfilled the assignment of the CPSU Central Committee for selling 2 million tons of grain to the state. Comrade L. I. Brezhnev praised the republic highly for this in his talk at the November 1979 Plenum of the CPSU Central Committee.

Guided by the decrees of the CPSU Central Committee entitled "Further Improvement of Ideological and Political Indoctrination Work" and "The 110th Anniversary of the Birth of Vladimir Il'ich Lenin," the party organizations of the Bashkir ASSR are streamlining organizational and mass political work and orienting it to meeting the challenges posed by the November 1979 Plenum of the CPSU Central Committee regarding successful completion of the five-year plan and celebrating the Lenin anniversary and 26th Congress of the CPSU in a worthy manner.

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BASHKIR ASSR DEPUTY MINISTER COMMENTS ON AGRICULTURAL GOALS

Saratov STEPNYYE PROSTORY in Russian No 3, Mar 80 pp 22-23

[Article by B. I. Petrov, first deputy minister of agriculture of the Bashkir ASSR, candidate of economic sciences, Hero of Socialist Labor, and Honored Agronomist of the Bashkir ASSR: "The New Goals of Bashkir Farmers"]

[Text] Carrying out the historic resolutions of the 25th party congress, the working people of Bashkir kolkhozes and sovkhozes have made numerous advances in agricultural development during the 10th Five-Year Plan.

Average annual grain production increased 1.5 million tons or 38 percent compared to the Ninth Five-Year Plan. Gross harvests rose to 5,250,000 tons in this period. This growth was achieved by raising yields from 12.8 to 17.2 quintals per hectare.

State purchases of grain increased significantly, averaging 2,231,000 tons a year, an 80 percent increase. The production and state purchase of sugar beets, sunflower oil seed, potatoes, and vegetables also increased.

In 1979 an average of 15.9 quintals of grain per hectare was harvested from an area of more than 3 million hectares. More than 2 million tons of grain was sold to the state, in addition to 940,000 tons of sugar beets, 35,000 tons of sunflower oil seed, 221,000 tons of potatoes, and 104,000 tons of vegetables.

A great deal of work is being done in the republic for the continued development of animal husbandry and switching it to an industrial footing. This has made it possible to increase the production of output and fulfill plans for the first four years of the five-year plan with respect to state purchases of meat, milk, eggs, and wool. In the period 1976-1979 the average annual volume of gross agricultural output was 22 percent greater than in the Ninth Five-Year Plan.

These results have been achieved through successful implementation of the party program to strengthen the material-technical base of the kolkhozes, increase the power available to them, and concentrate and specialize the farms.

Purposeful work is being done at farms in the republic to make more efficient use of land resources, raise the sophistication of farming practices, improve seed growing, and straighten out the use of fertilizer.

We cannot, however, be content with the results that have been achieved in the development of agricultural production, principally grain, industrial crops, and feed. Many farms are far short of doing everything possible to put available reserves for raising efficiency and improving farming stability into use. This is shown by the great diversity in the indicators of economic activity of particular rayons, kolkhozes, and sovkhozes located in roughly similar natural and economic conditions.

The chief ways to raise yield are to organize vigorous work to increase soil fertility, improve the use of soils, and introduce a full range of organized and scientifically substantiated farming practices on a planned basis.

Needless to say, this is a long-term job and work will be steadily refined as scientific achievements and progressive practices are taken into account. The progressive know-how accumulated in the republic, the growing capabilities of the kolkhozes and sovkhozes, and substantial state aid enabled this work to go forward at a high rate.

We have rayons and farms which receive high, stable yields every year. For example, the average grain yield in Ilishevskiy Rayon in the last four years was 26.2 quintals per hectare, nine quintals more than the republic average. Many kolkhozes and sovkhozes received 35-40 quintals of grain, 350 quintals of sugar beets, 20 quintals of sunflower oil seed, 150 quintals of potatoes, and up to 500-600 quintals of root feeds, silage crops, and vegetables per hectare.

At the same time, we also have many farms where yields continue to be low. This is especially true in the non-chernozem zone. This is our paramount challenge today, to bring these farms up to the level of average and leading farms. This is the crux of the matter now.

Agricultural agencies made a detailed study of the situation with development of crop farming. A s[illegible] organizational and scientific farming procedures was develope[illegible]h kolkhoz, sovkhoz, and rayon. These plans were reviewed and ratif[illegible] by the plenums of rayon and oblast party committees. The goal is to insure a stable crop of at least 20-21 quintals of grain, 225 quintals of sugar beets, and

14-15 quintals of sunflower per hectare and to achieve a sharp increase in the yield of feed crops, potatoes, and vegetables with an improvement in product quality.

If this yield figure can be met the republic will be able to fulfill its 1980 plans and the five-year plan as a whole. Among measures to raise yield and increase gross harvests of grain and other crops special attention is being devoted to planting seeds of high-yield intensive varieties, improving the structure of crop areas, improving farming practices for raising feed crops, efficient use of mineral fertilizers, and increasing the application of organic fertilizer to 20 million tons annually. Plans envision increasing the area of irrigated land to 170,000 hectares, liming acid soils on 245,000 hectares each year, and taking steps to protect soil against water and wind erosion.

The republic has generally completed the institution of production specialization for grain, industrial crops, potatoes, and vegetables and crop rotations have been introduced and incorporated. The Ministry of Agriculture and scientific research institutions have developed a system of agricultural management applicable to the soil and climate zones.

It should be observed that there are significant problems in incorporating the crop rotations. The point is that the area of clean fallow, one of the important factors in crop stability, has not been increased to the optimal amount.

Clean fallow, in particular bare fallow, makes it possible for arid regions to accumulate adequate moisture and get normal sprouting in winter crops. Clean fallow is especially important in the non-chernozem zone, which has the highest concentration of rye. On this land the fallow-occupying pea crop matures late and thus winter crop planting is done late, sprouts are thin, and the plants do not have time to bush out in the fall. This leads to a high mortality rate, replanting every year, and low yields of rye and subsequent crops in the rotation. We must increase the area of clean fallow to 12 percent in conformity with the crop rotation plans that have been adopted; the actual figure today is just six percent of arable land.

A great deal of work is needed to develop the soils, in particular at farms at the non-chernozem zone which has more than 1.5 million hectares or 35 percent of the arable land. The principal cause of the low yields in this zone is the extremely poor gray forest soil. Without substantial development of the plowing horizon by application of fertilizer, liming, clover planting, and other scientific farming practices there can be no highly efficient and stable crop farming in this zone. Nonetheless, this work is going slowly and being done poorly. Detachments from the water management agencies, from Goskomsel'khoztekhnika, and from Sel'khozkhimob"yedineniye [Agricultural Chemistry Association] are not equipped with the necessary machinery. The problem of supplying material for liming has not been solved yet.

The level and stability of yields depend significantly on efficient use of mineral fertilizers. In recent years only about two quintals of standard fertilizer or 40 kilograms of active substance have been applied per hectare of arable land at farms in the republic.

A significant share of the fertilizer is used for sugar beets and other industrial crops, while grain and feed crops receive only small planting applications and supplementary feedings which do not cover the full area. In the last two years the republic has received 200,000 tons less standard fertilizer than planned.

Improving the quality of soil tillage and reducing the time spent on field jobs are very important steps to receive high yields. More than 75 percent of the arable land in the Bashkir ASSR is subject to drought and to water and wind erosion. The steppe regions of the Transurals and Suburals suffer particularly. In this region important practices include soil tillage without a mold board that leaves the stubble, plowing across slopes, deepening the plowing horizon to 28-30 centimeters, planting windbreaks on fallow land, and taking other steps to protect the soil.

Feed production presents a difficult problem. The yield of feed crops and natural feed lands does not fully meet the needs of animal husbandry. As a result, the meat and dairy productivity of livestock at many farms is low.

Among the steps planned to straighten out this situation are planting fodder grass with correct ratios of grass and legume components, fundamentally improving seed growing, expanding the production of feed peas, vetch, alfalfa, sainfoin, and sweet clover, and improving farming practices for feed crops. Progressive methods of laying in feeds and storing them will be used extensively. Steps are also being taken to improve natural feed lands and to construct irrigated crop pastures and operate them correctly.

The kolkhozes and sovkhozes of the republic possess significant reserves for the production of grain, industrial crops, feed, and other products. The paramount task of agricultural agencies and all Bashkir farmers is to put them into use, to take concrete steps to raise the efficiency and stability of crop farming, applying their efforts and capacities fully.

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TILLING AND CROPPING TECHNOLOGY

BASIS OF AGRICULTURAL ACHIEVEMENTS OF BASHKIR ASSR REVIEWED

Moscow SEL'SKOYE KHOZYAYSTVO ROSSII in Russian No 4, Apr 80 p 40

[Article by N. Kozlov, candidate of agricultural sciences: "Increasing the Productivity of Each Hectare"]

[Text] At the November 1979 Plenum of the CPSU Central Committee Comrade L. I. Brezhnev stressed that the farms of Altayskiy and Krasnodarskiy krays and the Bashkir ASSR sold a significant amount of grain to the state. This called forth a surge of enthusiasm in the republic for large-scale socialist competition among grain growers to expand their accomplishments even further. Progressive methods and techniques of increasing the productivity of the land are being introduced vigorously everywhere.

Our successes in development of grain growing did not, of course, come quickly. It took many years to learn how to raise consistently high yields. Despite the extremely harsh conditions last year, the republic was able to sell more than 2 million tons of grain to the state. The full seed requirement was met. The basis for all of this was improved crop farming sophistication, a strong material-technical base, and the skillful work of our grain growers.

We have developed and are introducing broadly a comprehensive program for intensification of grain growing. In the period 1971-1975 our farms harvested 12.8 quintals per hectare, while in 1976-1978 the yield was 16.8. The gross grain harvest reached more than 5 million tons, an increase of 50 percent over the Ninth Five-Year Plan.

Disseminating the know-how of innovative workers is a truly inexhaustible reserve for raising production efficiency. This is precisely the attitude taken by party organizations toward solving the key problems of raising yield, fieldwork sophistication, and the fertility of the land. The republic has established a definite system for propagation and dissemination of all new and progressive ideas. Schools of progressive know-how have been organized by zones and at them workers learn the most effective technology and labor organization. Calculations show that the introduction of scientific advances and broad dissemination of the practices of leading farms and master farmers will make it possible to raise yield in the final year of the 10th Five-Year Plan and increase the gross production of grain to 5-6 million tons.

Of course, such growth is possible only with a steady increase in soil fertility, concentration and specialization of production, and improvement in the structure of the grain sector. Attention is being concentrated, in particular, on raising winter rye, which is planted in all zones. This crop has been planted on 536,000 hectares, mostly after clean fallow, which gives the highest and most stable yields. The area planted in winter wheat is increasing sharply in the steppe zone; it will reach 156,000 hectares this year, which is 5.5 times more than in 1975.

The new intensive winter rye variety Chulpan has received wide recognition and is used almost universally. Plantings of the highest-yielding grain forage crops have been expanded. For example, the area planted in spring barley has increased to 73,000 hectares and oats to 16,200. Plantings of legume crops, a high-protein feed, have expanded.

Raising soil fertility demands not just correct crop rotations but also accumulation and efficient use of soil moisture. This is achieved by graded tilling of the soil with optimal times for each farming procedure. Incidentally, we used to spend 12-15 days planting spring grain crops, but last year it took just one week.

The steady increase in the productivity of grain fields inevitably requires skillful use of fertilizers. In just the last five years the application of fertilizer has almost doubled, reaching 160 kilograms per hectare. Each kilogram of fertilizer pays off with an additional 5-6 kilograms of grain.

Virtually all granulated fertilizers are applied locally, in the rows, which again gives an additional 2-3 quintals. Fertilizers that are strictly balanced by nutrient elements are applied with due regard for the appraised quality of the soil, agrochemical map-plans, and the planned yield.

It has become a standard practice to draw up map-plans of the need for all types of fertilizers (silt, ash, and others).

It is impossible to intensify grain production without a proper system of seed growing switched to an industrial footing. The republic has set up a network of seed growing farms which supplies the kolkhozes and sovkhozes with high-quality seeds of the best varieties. The Sortsemprom [Varietal Seed Industry] Association formed by the republic, after building up the material-technical base of the specialized farms in a comparatively short time, sharply increased the production of varietal seeds. It has become the practice for farms to plant seeds of no less than the fourth reproduction and only of grades I and II.

In short, the farmers of the republic are doing everything they can to celebrate 1980, the year of the Lenin anniversary, with even more significant achievements in grain production.

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NEW CHULPAN WINTER RYE VARIETY HOLDS GREAT PROMISE IN BASHKIRIYA

Moscow SEL'SKOYE KHOZYAYSTVO ROSSII in Russian No 4, Apr 80 pp 41-43

[Article by S. Kunakbayev, head of the laboratory of winter crop plant breeding of the Bashkir Scientific Research Institute of Agriculture, and Professor N. Bakhtizin: "Problems of Rye Farming in the Bashkir ASSR"]

[Text] Winter rye is the principal grain crop of the Bashkir ASSR. It is the grain that is best adapted to our climatic conditions. It withstands the harsh winter of the Urals better than winter wheat and it does not suffer from summer drought the way the spring grains do. Its strong root system, extensively developed in the fall, enables the rye to use moisture from deeper soil horizons. Therefore, Bashkir grain growers have long treasured this crop: it is planted after clean fallow and receives abundant fertilizer.

In recent years, in connection with the appearance of high-yield wheat varieties and inadequate stimulation for rye production through state purchase prices, the attitude toward rye in the republic has changed. The managers and specialists at many farms, infatuated with the new wheat varieties, reduced the area planted in rye, forgetting the advantages of the crop and the large demand for it. As a result the production of rye grain in the Bashkir ASSR decreased significantly. Neither winter nor spring wheat made up this loss.

At the same time, practice shows persuasively that rye is the crop capable of giving high, stable yields. Figures for the 16 state varietal testing plots and our institute's two experimental production farms show that the average yield of winter rye over the last nine years was 24.1 quintals per hectare while spring wheat produced 21.2. In very dry years the rye had an even greater advantage. However, the decrease in attention given to rye retarded the general trend in the republic toward a rise in its yield and an increase in gross harvests of the grain. It could not be otherwise as the rye was supplanted from clean fallow fields by grains with lower yield potential under our conditions. In many rayons which receive less than 300 millimeters of precipitation on the average per year, rye began to be planted after non-fallow predecessors in poorly prepared and unfertilized soil.

Redesigning the Rye Plant

The situation was made worse by the fact that the tall rye plant was unable to use the force of chemicalization fully to increase yields and had a tendency to lodge. This occurred because all the regionalized rye varieties were tall. In other words, there was a natural barrier to high yields, the plant's excessive height. It used a large part of its nutrients and moisture for the long straw. And the more nutrients and moisture the soil contained, the taller the plant would grow, losing its resistance to lodging. When the grain did lodge, naturally, formation of the grain was inhibited and its weight and quality were less. Moreover harvesting became more difficult and there were significant losses of grain already grown. In short, it was necessary to "redesign" the rye plant, to create a variety with a short, stable stem.

The laboratory of winter crop plant breeding at our institute set out this challenge for itself as long ago as the early 1960's. To be frank, it proved to be a hard job. It took more than 10 years to develop a complex synthetic population made up of the best genotypes, reproduced from a series of different ecological hybrids; in addition numerous controlled selections had to be made. Domestic and foreign varieties belonging to different ecological groups were used as donors of the crucial economic and biological characteristics.

Associates at the laboratory finally managed to breed a high-yield semidwarf winter rye variety. It was named "Chulpan" (the morning star). It is now being introduced into production extensively not only in the Bashkir ASSR, but also in the Tatar, Mordovian, Mari, Udmurt, and Chuvash republics and Vladimirskaya, Volgogradskaya, Gor'kovskaya, and Tul'skaya oblasts. Suffice it to say that about 400,000 hectares in the Russian Federation are being planted with this variety this year.

This rapid spread of a new variety is a result of the fact that it successfully combines a short stem with high productivity and winter hardiness and resistance to lodging with drought hardiness and the ability to adapt to different conditions. Chulpan produces record high yields with comprehensive application of optimal farming practices and normal weather conditions. This is illustrated by figures from both testing and production fields. For example, in 1978 its yield at the Abzelilovskiy varietal testing plot in the Transural steppe during competitive varietal testing was 58.8 quintals per hectare, surpassing the standard Chishminskaya 2 variety by 18.4 quintals. In production varietal testing Chulpan produced 50.3 quintals per hectare, 14.3 quintals more than the standard. During the same year the semidwarf variety surpassed the tall-stemmed Chishminskaya 2 rye variety by 8.9 quintals per hectare in competitive varietal testing at the Budyakskiy varietal testing plot in the Subural steppe and beat it by 18.6 quintals per hectare in production testing. The winter rye produced a gain in yield of 11.6-22.1 quintals per hectare compared to the standard at the Samoylovka state varietal testing plot in Saratovskaya Oblast and the Ivanovo plot in Ivanovskaya Oblast. Chulpan produced an average of 54.4 quintals per hectare in 1978-79 at the Bogoroditsk varietal testing plot in Tul'skaya Oblast. It surpassed the Voskhod variety by 13.9 quintals per hectare.

The high winter hardiness of the variety has been confirmed by our studies with artificial freezing of the plants and also by results of an inventory of the overwintering of production fields in different soil and climate zones. Specifically, in competitive testing at the Duvanskiy varietal testing plot in the northeastern forest-steppe zone of the republic 89 percent of the Chulpan plants survived the winter, while just 46 percent of the regionalized Vyatka 2 variety did. At the Aleksin testing station in Tul'skaya Oblast and the Saransk station in the Mordovian ASSR, 100 percent of the Chulpan variety survived the winter.

What does the Chulpan plant look like? It is 45 centimeters or more shorter than the varieties regionalized earlier. Its average length is 90-100 centimeters. The straw is very strong, which gives it high stability to lodging. At 16 state varietal testing plots in our republic in 1978 Chulpan had a lodging resistance index of 4.9 where the figure for the standard winter rye varieties (Birskaya 2 and Chishminskaya 2) was just 3.1 points. Because of the plant's resistance to lodging the productivity of combines harvesting the short-stem variety is almost double the productivity figure for lodged stands of long-stem rye. Grain losses are also reduced in this case. Incidentally, the grain is of average size; 1,000 grains weigh 24-30 grams. The baking qualities are good.

The high yield of this variety is basically a result of the better survival rate of the plants, their greater productive bushiness, and the greater weight of the grain in the head. These qualities opened the door for the variety to be put into production quickly; 260,000 hectares were planted with this variety in the Bashkir ASSR for the 1980 harvest, which is more than half of the rye that was planted. We hope that this variety will play a significant part in further increasing gross harvests and sales of this valuable food grain in our republic. But there is one essential condition for this: we must rekindle the grain farmers' affection for winter rye.

Clean Fallow Is the Best Predecessor

Numerous tests at our institute and in the department of plant growing of the Bashkir Agricultural Institute have established that Chulpan rye is capable of responding to improved scientific farming practices with a greater yield. Therefore, fields of this crop should be planted after the best predecessors, above all clean fallow which has been well fertilized with organic and mineral fertilizers. Bare fallow is especially productive in this case. When the crop is planted after occupied fallow, the field should be tilled well at the proper time and given good fertilization, as is done, for example, at the highly sophisticated farms of Ilishevskiy Rayon. They always make sure that fallow-occupying crops are harvested early (in the first half of June) there, and they do not allow a gap in time between harvesting and soil tillage. When preparing occupied fallow for a rye crop the farmers of Ilishevskiy Rayon plan shallow tillage and application of nitrogen-phosphorus fertilizer. Even where this is done, however, rye yield after occupied fallow is 25-30 percent lower than the yield produced on clean fallow.

The effect of the predecessor on the yield of rye varieties raised under conditions of adequate moisture is eloquently demonstrated by the comparative figures for Dyurtyulinskiy Rayon for 1978 (see table below).

Table

Indicator	Chulpan		Birskaya 2	
	Clean Fallow	Occupied Fallow	Clean Fallow	Occupied Fallow
Grain Yield, quin/ha	54.8	38.7	43.1	34.3
Completeness of Sprouts, %	70	67	71	67
Number of Plants per Square Meter at Harvesting	347	329	335	314
Number of Productive Stems per Square Meter at Harvesting	571	495	400	398

Scientific Farming Procedures for an Intensive Variety

To insure an increase in rye production, one must not only provide the best predecessor for this crop but also employ the full set of scientific farming practices developed for its cultivation. We must not forget that winter rye is very responsive to fertilizer. Specifically, at the Belebey state varietal testing plots in 1978, a good year for moisture, Chulpan planted after well-manured clean fallow produced a yield of 55.1 quintals of grain per hectare. But when full mineral fertilization was added to the manure the yield rose to 57.8 quintals. Even with the excellent farming practices of the testing plot additional fertilization for the Chulpan variety produced a gain in yield where the application of a similar dose of mineral fertilizer to the tall Birskaya 2 variety reduced its yield. In a good fertilization setting with a yield of 57.8 quintals per hectare Chulpan preserved its high resistance to lodging.

Thus, the new variety is highly responsive to fertilizer. Large doses of fertilizer must be applied to get yields of 40 quintals and more per hectare. The basic fertilizer for early clean fallow plowing should be well-prepared manure or peat compost in these amounts: 30-40 tons per hectare on non-chernozem soils and 20-30 tons on chernozem soils. During preplanting tillage 40-50 kilograms of active substance of mineral fertilizers (NPK) is applied per hectare. Granulated superphosphate (P_{20}) or nitroammofos calculated for the same amount of phosphorus must be applied to the rows in planting in all zones and all settings. Fall or spring nitrogen supplementation in doses of 30-45 kilograms of active substance per hectare is an essential procedure in the fertilization system for this variety of winter rye.

These practices are followed by the leading farms in the Bashkir ASSR. For example, the average grain yield in 1978 at the Iskra, Oktyabr', and imeni Kuybyshev kolkhozes in Ilishevskiy Rayon exceeded 40 quintals per hectare, and was even higher in some fields. Brigade No 1 at the Oktyabr' Kolkhoz got 49.4 quintals per hectare from the short-stem rye, and brigade No 2 received 50. The first team of this brigade, led by R. M. Mukhametglaeyev, which did its planting on well-fertilized bare fallow, reached a yield of 54 quintals.

The yield of the Chulpan variety at the Chishma Kolkhoz in Dyurtyulinskiy Rayon in 1979 was 52.1 quintals per hectare for 45 planted hectares, while the Kommunar Kolkhoz in Ilishevskiy Rayon, which planted 119 hectares, got 39.7. In the same year the western division of the Mir Sovkhoz in Blagovarskiy received 55.7 quintals per hectare of the Chulpan variety on an area of 30 hectares, and the Topornlnskiy division harvested 39.4 quintals per hectare from 60 hectares.

Tests made in different climate zones show that Chulpan does not differ from other regionalized varieties of rye in reaction to planting time. In the northern and northeastern forest-steppe zones, the northern part of the Transural region, and the mountain-forest zone the optimal period is 10-20 August; in the Subural steppe, southern part of the Transural region, and transitional zone between the forest and steppe it is 15-25 August. It is wise to plant rye on occupied fallow during the first days of these periods.

In the northern and northeastern parts of the republic where more than half of the winter rye is planted, the planting is often delayed not just by delay in harvesting the fallow-occupying crop but also by the fact that the farms use freshly harvested grain for seed. The use of such physiologically immature seed is one of the causes of crop thinning and mortality, and consequently also of low yields. According to figures from our studies, freshly harvested seed has a low germination rate and retarded pace of fall development. Therefore, a stock of seed from the previous year's harvest sufficient to cover the full crop area should be established in all regions, particularly the northern regions.

The development of a low-growing winter rye variety has increased the potential of this crop and uncovered enormous reserves for growing rye. To take full advantage of them each kolkhoz and sovkhoz must sharply improve farming sophistication and raise rye after the best predecessors, observing all scientific farming practices.

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